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# READINGS IN INDUSTRIAL AND BUSINESS PSYCHOLOGY

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**FIRST EDITION**

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READINGS IN INDUSTRIAL AND BUSINESS PSYCHOLOGY

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## Preface

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Within recent years there have appeared a considerable number of books of selected readings in the various fields of psychology. The general acceptance of these volumes would seem to indicate a need for source books to which teacher and student can turn in order to examine critical writings in their original form. In the present volume the editors have tried to bring together important representative articles in the area of industrial and business psychology.

The compilation in itself does not present an over-all integrated coverage of the field of industrial and business psychology. It is selective rather than exhaustive. It is a supplement to, not a substitute for, a systematic account. It should therefore be useful in courses where an instructor uses a textbook for systematization or in lecture or seminar courses where continuity and integration are provided by the instructor himself.

The present selection is the result of an examination of approximately 500 articles in the literature. Most of the material is of relatively recent issue, since the general aim has been to exemplify current trends of thinking in the field. Professionally sound writing and a concrete contribution toward the solution of some problem areas have been important criteria in the selection process. While a number of the articles are of a technical nature, the editors have tried to include a generous sample of writings which will appeal not only to an academic audience but also to those individuals who are on the scene, so to speak, in business and industry. Too often we hear the complaint that writing in industrial and business psychology is couched in such academic and technical language as to be of little use to the practical businessman. It is hoped that the present volume will aid in bridging the gap between "academic" and "consumer" psychology.

Obviously, this book would never have appeared without the aid of numerous collaborators. The editors gratefully acknowledge the courtesy of the large number of publishers and living authors who have permitted their material to be reprinted in this volume. Detailed acknowledgments will be found in connection with the individual selections.

HARRY W. KARN  
B. VON HALLER GILMER

PITTSBURGH, PA.  
January, 1952

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## Part One: MOTIVATION AND MORALE

### 1. Psychological Aspects of Industrial Conflict. Motivation

*Ross Stagner*

Reprinted from *Personnel Psychology*, 1950, 3, 1-15, by permission of the author and of Personnel Psychology, Inc. An analysis of the psychological problem of motivation in business and industry. The author takes the position that any oversimplified view which rests entirely upon an economic approach to motivation can never give an adequate picture of the dynamics of industrial conflict. Instead, a complete picture requires careful consideration of two factors: what the people involved really want; and how they see the facts of the situation.

The problem of industrial conflict is the problem of what people want and the methods by which they try to get it. This is the psychological problem of motivation. It must be analyzed in terms of specific human beings: managers, and workers, and union leaders. It cannot be analyzed effectively in terms of industry and labor as collective groups, nor even in terms of a specific corporation and its local union.

It is completely fallacious to say that "The union wants this" or "The company demands that." A set of union demands will generally include the desires of various specific individuals. It is a political document calculated to obtain support from the people who are the union members. It must take account of people with vested interests in seniority, in skill, in job rates; it must consider the problems of men faced by old age, layoffs, irritating foremen, rising prices, and other frustrations. What the union wants is ultimately determined by what certain individuals want.

In the same way the company as an abstraction does not want anything. Anyone who has ever participated in planning for contract negotiations knows that production supervisors want different provisions, the personnel staff may have its own proposals, public relations may introduce some ideas, and so on. While there is likely to be greater unanimity in the management group, this is partly a result of company discipline, not uniformity of motives.

The problem of motivation is the problem of energy-mobilization. Under what circumstances do men exert great effort, endure hardship, overcome

obstacles? Such behavior is seen only when strong motives impel the men concerned toward a goal they desire. Motives provide the dynamic basis for strikes, slowdowns and sabotage on the part of workers; lockouts, espionage and union-breaking on the part of employers. To understand such occurrences, we must get a clearer understanding of the motives on both sides.

There are many misconceptions regarding the causes of industrial conflict. Many newspaper columnists in the vein of Westbrook Pegler seem to believe that workers strike for fun or for no reason at all. During the war many wildcat strikes were reported as being based on trifles such as running out of soap in the locker room or dislike of the foreman's neckties. A personal investigation of one of these, which could probably be duplicated many times, indicated that the apparently sudden, aimless wildcat strike had been brewing for months. The foreman in this particular instance had been playing favorites, giving some men dirty assignments and others soft jobs, granting or denying wage increases and so on with little regard for the merit of the individual worker, but rather on the basis of personal friendship. The personnel manager in charge admitted (after he learned the facts) that it was surprising that the men waited so long before exploding into an open strike.

Some union leaders also tend to foster a mythology of employers as being ready to precipitate a strike or a lockout at the drop of a monkey wrench. According to this view, managers are dominated by a desire to smash the union which is so strong that any pretext will be seized upon if conditions seem favorable to weaken the union. Actually, of course, most businesses lose a lot of money in a strike. The average manager does not blindly enter upon a course of action which is certain to lead to work stoppage. Overhead costs go on. Competitors pick up accounts, orders are cancelled. The Board of Directors may decide to fire the manager and hire one who can get worker cooperation.

**The "Dollar Fallacy."** A second common error in the field of the psychology of motivation as applied to industry may be called the "dollar fallacy." According to this view employers are motivated only by a concern for dollars and cents, and workers likewise are motivated only by what is in the pay envelope.

The statistics of the Department of Labor are often referred to as evidence of the dominance of economic motivation in strikes. Thus, in 1948, it is reported 73.9% of all strikes in the U.S.A. involved higher wages or shorter hours as an issue.<sup>1</sup>

No one knows better than the average personnel manager how fallacious these figures are. In many cases the workers first get angry and go on

<sup>1</sup> *Monthly Labor Review*, 1949 (May), 68, 505-513.

strike, then look around for something to demand. Higher wages and shorter hours are simple, neat and easy to formulate. It is thus likely that in many cases they are secondary demands, made up to rationalize the fact that the workers are unable to state exactly what it is that they want. It is a truism of modern psychology that both employers and workers frequently are not conscious of their real motives. Thus, the workers who may be unaware of what they want, or whose real motives may be such that satisfaction is impossible, are likely to make economic demands in an attempt to get some balm for their frustrated egos.

The fallacy of the view that only money counts can be seen rather promptly if we consider even a single strike which lasts for any considerable period of time. Thus the Hinde and Dauch Paper Company has reported on the cost to their employees of a strike which lasted 103 days in 1946. The strike was eventually settled on the basis of an  $18\frac{1}{2}\text{¢}$  per hour wage increase—as compared with  $13\frac{1}{2}\text{¢}$  offered by the company before the strike was called. On this basis it has been computed that it would require the workers five years and most of a sixth year to recoup the wages lost during this one strike. The total loss to the employees was estimated at \$684,000. The cost to the company in terms of profits is not reported, but it must have been considerable. Under the special conditions existing in 1946 there may not have been any net loss in sales accounts as a result of competition, but in ordinary times this would also constitute a serious threat to a company indulging in anti-labor activities. It seems extremely unlikely, therefore, that any oversimplified view which rests entirely upon an economic approach to motivation can ever give us an adequate picture of the dynamics of industrial conflict.

The limited possibilities of the purely economic approach to motivation have become obvious in many studies of union-management relations. In their excellent analysis of the S. Buchsbaum & Company situation, Whiteford, Whyte and Gardner have commented that "While economic factors must receive careful attention in any union-management study, it is very clear that in this case, as in many others, these factors formed only a small part of the motivation of the people in both camps."

Despite the fact that most operating personnel men are acquainted with this situation, the thinking of industry has until recently tended to focus on pay as the dominant employee motive. This may well be due to the fact that our economy is dominated by profit as a sign of competitive success. Since the success of a manager can be measured in terms of dollars of profit, he tends to generalize and assume that the success and satisfaction to the worker can be directly related to wages.

This is in actual fact no more correct for the worker than it is for the manager. If the executive had a dreary, monotonous job with little chance for

planning, for individual self-expression, and so on, he probably would not be happy and satisfied even with a high profit rate. Common observation will confirm this statement. When the worker feels that work is dull, orders arbitrary, the job insecure and prospects for advancement dim, high wages have little soothing value for him. We have recently had strikes by "workers" receiving an average pay of \$10,000 or more per year (airline pilots, Hollywood script writers). To imply that these are economically motivated, merely because pay increases were demanded, is to be very naive about human nature.

Psychologists are prone to emphasize the fact that each of man's activities tends to express various motives. For instance, one works to get money for food and shelter, but also wants an interesting job, a fair supervisor, friendly coworkers, security and so on. Having taken a job for purely economic reasons, the worker immediately begins trying to satisfy, on and through the job, his social and egoistic motives. A man may start a business and hope for profit, but he will start getting satisfactions out of planning, supervising others, meeting competition and so forth, in ways that are non-economic and even in ways that cost him money in terms of profit.

It is only if we keep this view uppermost in our minds that we can resolve the apparent conflict between the official statistics, which show workers striking for higher wages and employers striving always for higher profits; and the knowledge of operating executives that many strikes arise over issues of security, favoritism, power, recognition and similar non-economic goals.

We must therefore raise the question: What does modern psychology have to say with regard to human motives? What do executives want? What do workers want? How strong are these drives, and which will take priority over others? When we get satisfactory answers to such questions, we will have the facts with which to solve the knotty problem of industrial conflict.

Several different methods have been employed in attempts to estimate the potency of different motives to affect workers. We shall illustrate these by sample data and indicate briefly their strong and weak points.

First of all, we may directly ask the worker to indicate how important he considers specific items to be. Thus, a corporation with nation-wide operations asked its employees in 1947 to indicate which of a list of factors was most important to them on their jobs.

The question read as follows: "On the enclosed sheet you will find a list of factors which affect your job and the way you feel about the company. Read every item on the list. Mark with a number '1' the item that is most important of all to you. Then check over the list again and mark with a '2' the item which is second in importance. Continue this way until you have marked five (5) items." A total of 19 items was listed.

Table 1 shows the results for over 7,000 employees who answered (almost a 50% return, incidentally). If these results are taken at face value, the

TABLE 1. RATINGS OF IMPORTANCE BY WORKERS ON VARIOUS JOB FACTORS

	% of 7,000 Workers Including This Item in the First Five	First Choices Only
A steady job.....	61.9%	36.1%
Pay rate.....	52.6	7.2
A chance to get ahead.....	41.9	6.9
A square boss.....	39.6	4.8
Working on the job you prefer...	35.3	15.2
Credit for the job you do.....	29.6	2.2
Vacations and holidays.....	21.5	0.4
Friendly working companions....	21.3	0.7
Medical and health facilities.....	20.8	0.6
Pension.....	9.7	7.1

desire for security (for a steady job) was most powerful among these workers at this time. Although one may well question whether the average man can really decide what is most important about his job, we are impressed with the extent to which this table foreshadows the union drive for security, expressed, however, in a demand for pensions and welfare funds. (It is interesting to note that pensions represent the only issue in which practically all its votes were in first position. These were no doubt from workers nearing retirement age, at which point the pension would look very important indeed.)

Psychologists have grave doubts as to the validity of such a direct question. Motives are subtle, and situations complex. Many experts in this area prefer an indirect method of assaying the significance of motives.

One such method is as follows: employees answer a considerable list of questions, such as "Are you told when you do a good job?" "Is your pay fair as compared with other jobs in the plant?" Satisfaction scores are determined by giving one point for each "Yes" answer. On this basis a group of highly satisfied workers is selected, and compared with a markedly dissatisfied group. We then determine how well a specific item predicts whether a man will fall in the high or the low group. Items which predict overall satisfaction seem to be valid evidences of factors important to the worker—evidences of strong motivation.

Actual use in plants has shown that this method does pick out "sore spots" in the organization. J. D. Houser, in his unfortunately little-read book, *What*

*People Want from Business*, gives some excellent illustrations of its use. Table 2 is modified from one of his. Rank is determined by success with

TABLE 2. DEGREE OF DISSATISFACTION WITH VARIOUS CONDITIONS, AMONG WORKERS AND EXECUTIVES \*

	Executives		Employees			
	Rank	Per- cent Dis- sat.	Selling		Non-selling	
			Rank	Per- cent Dis- sat.	Rank	Per- cent Dis- sat.
Knowing whether work is improving or not	1	39	1	13	1	36
Opportunity for fair treatment and square deal.....	2	24	5	27	3	33
Opportunity for offering suggestions in work.....	3	63	3	66	2	76
Conflicting orders.....	4	44	12	52	10	62
Freedom to seek advice.....	5	43	6	54	5	61
Promotion for best qualified person.....	8	73	2	76	4	80
Reasons given for changes ordered in work	13	33	8	51	7	60
Assurance of pay increase when deserved.	18	70	9	59	13	76
Pay—compared with same work in other stores.....	20	37	17	39	21	66

\* Modified from Houser, (4), p. 83.

which the item distinguishes high and low morale cases within the group: executives, sales, non-sales employees. Percent dissatisfied is the percent of each group indicating an unsatisfactory feeling on this point.

This table suggests that both workers and executives in this company were especially concerned about recognition—about their standing with superiors, or praise for work well done. Houser believes, on the basis of his wide experience in industrial consultation, that this is the fundamental human motive—the desire to be recognized as an individual. As he puts it, "What the worker wants is a minimum essential of life, and the word is consideration—regard for his simple dignity as a man. It is the least he can ask."

As has been noted above, psychologists are skeptical of attempts to over-generalize about motives. Table 3 summarizes some data collected by a method similar to Houser's, but at the time of the upswing in the economic cycle in

TABLE 3. FACTORS INFLUENCING WORKER SATISFACTION IN 1940

	% Satisfied (Of Total Group)	Critical Ratio *
Do you feel the factory could afford to pay more?.....	12	6.92
Do you like the kind of work you do on your job?.....	84	5.86
Are you told when you are doing a good job?.....	47	4.47
Do you feel allowed to offer suggestions as to methods of improvement?.....	76	3.83
Do you believe that the bosses and supervisors are always fair to you?.....	91	3.76
Should the mill where you work be fixed up in light, heat, ventilation, etc.?.....	74	2.22
Are you friendly with the men who work alongside of you?.....	97	0.57

\* The "Critical Ratio" is a measure of the difference between the 30 most satisfied and 30 most dissatisfied workers. Total group = 150 machine tool workers.

1940. In this case concern over pay, which ranks low in most of Houser's surveys, hits first rank. This may, however, be due to the fact that price inflation was already under way, and pay may well have been the real "sore spot" with these workers.

Another source of evidence is in the published reports of the intensive, clinical-type interviews conducted in the Western Electric Plant at Hawthorne, Illinois, which have provided so much data for modern industrial psychology. While these cannot be reduced to a simple table, it is clear from the detailed information published by Roethlisberger and Dickson that "social conditions on the job" (supervision, etc.) are considerably more important than physical working conditions or pay. This may be buttressed by the experimental studies in this same plant, which indicated that recognition and other ego-centered motives could speed up production as much as a very substantial increase in pay.

Finally, it is important to note that actual field studies of supervision and productivity emphasize the importance of ego-motivation. Katz, reporting on the Survey Research Center studies, comments that supervisors who get high productivity from their workers are characterized by: placing less emphasis on production as a goal; encouraging more employee participation; and using positive methods of personal recognition of the individual employee.

All of this seems somehow reminiscent of the anecdote told of Samuel Gompers, longtime head of the American Federation of Labor. When someone asked him, "What does labor really want?" he is said to have replied succinctly, "More!" Workers want more of whatever is needed for complete

ego-satisfaction at any given time: pay, security, praise, recognition, self-expression. No single specific kind of satisfaction can be cited as the key to worker motivation.

There are two lessons to be learned from these data. One is that we must not rely on past experience, but must ascertain now, in this situation, what the workers want. The second is that workers want more of whatever is needed to maintain status at the time. When old age looms, they crave security; when prices are soaring, they want higher pay; when conditions are stable, they want praise, recognition and fair treatment. Thus it seems safe to say that ego-motivation, in its various forms, is the key to understanding the desires of employees.

The psychology of executives has been studied less intensively than that of the workers, for various reasons. We have, however, two good investigations of executive motivation—one by J. D. Houser, the other by B. B. Gardner and his associates at the University of Chicago. It will be instructive to review these.

Houser interviewed top executives—only presidents or board chairmen. He asked a variety of questions about personnel policy; but his real focus was on the motives behind these policies. While his report does not present many details, his broad generalizations are stated firmly and backed by numerous illustrations. His main conclusion is that executives desire self-expression, power and recognition. They resist any forces which cramp their freedom of action; they want to carry out their ideas unhampered by opposition.

“The sheer love for power so typical of autocratic attitudes everywhere is undoubtedly one of the greatest forces producing individual and group frictions . . . with a great many executives, this love of power is a blind but strong impulse. The degree of its expression is the measure of their most vital satisfaction. This was revealed time and again in the interviews. Sometimes this motive was conscious; more often it was not . . . it was apparent that men leading enterprises were often more eager to assert themselves in a manner personally satisfying than they were to achieve large returns for the organization.”

**Indirect Testing of Motives.** B. B. Gardner and his group of social scientists have been experimenting with the Thematic Apperception Test, a “projective” test for uncovering deeper motivation. A feature of the method is comparison of “successful” and “unsuccessful” executives to see what kinds of motives predict whether a man belongs in one group or the other. Their characterization of the “successful” executive stresses the following needs: need for achievement; not glory as such; need for prestige, but not as much as some of the unsuccessful executives; need to move upward; to accumulate property, to reap rewards for achieving, to acquire status in the eyes of associates; aggression, channeled into work or struggle for prestige, not

into personal feuds; lack of an end-point (the needs were not focused on a final goal, but there was always a more distant ambition when the current one was satisfied).

If we look at these two studies, and compare the findings with the data reported by Houser for executives on his questionnaire technique (Table 2), we see a startling resemblance. In all cases ego-motivation rather than economic motivation is predominant.

We are thus led to the interesting conclusion that popular psychology is wrong about both executives and workers. Neither group is primarily concerned about pay as such, except when economically pinched. At other times they prefer ego-satisfactions such as prestige, power, recognition, security, treatment as an individual.

To some extent we must go beyond the motivations of managers and workers and consider the dynamic aspects of the individual who is in the position of being an official of the union. Inasmuch as these are normally plant workers, they are likely to resemble the rank and file employee in most respects. In addition, however, they are likely to be ego-identified with the union and to be much concerned to make it a success. Just as the manager wants to keep his business above water, to make a profit, to out-distance competition, to increase sales, so the union officer wants to enlarge his union, build its treasury, make it bigger than competing unions and assert its bargaining power.

It seems pretty clear that in most cases, the union official cannot motivate strike activity if the workers are fundamentally satisfied. Strikes are supported by individual workers for quite varied reasons, but there must be some personal dissatisfaction which can be focused on the situation or he will not want to strike. Officials who precipitate many unpopular strikes lose their jobs. Thus, while the union officer may have personal motives for striking which do not affect the rank and file, he must attempt to relate the strike issue to the needs of the workers. This accounts for the mushrooming of demands in many strike situations. Each new demand may be needed to hold the support of some important group in the union.

The limitations set upon the union organizer or official by the emotional needs of the workers can well be illustrated by the following case:

"Company X is a small metal-fabricating plant in a medium-sized mid-western city. The workers felt very close to the president of the company, who was very friendly, paternalistic and careful of their problems. They turned deaf ears to both AFL and CIO organizers.

"Recently the president died and was replaced by another man—similar in personality but not well-acquainted with the local people. Because he did not know much about the technical side, he delegated much responsibility to a production man who was rather gruff and distant with the workers.

"Within two months the workers had signed to a man to join one of the unions they had earlier rejected."<sup>2</sup>

What has happened here might be stated psychologically as follows: The workers got a great deal of security and ego-satisfaction from their relationship to the president. His death caused them to feel insecure, and the poor human relations tactics of the production man increased this threat to them. They now see the union as a source of security, whereas before they saw it as a threat to their pleasant situation. The motive has not changed, but the situation now is seen in a different light.

From the organizer's point of view, the motivations and satisfactions may be quite different. He gets ego-expansion out of forming a new local; he feels proud when he wins a victory over a company official in grievance handling or contract negotiation. He has the same need for achievement, and often the same need for power and prestige, that we noted as characteristic of the company executive. His motives are very much the same as those of the executive; he is simply operating through a different organization to gain his satisfactions.

A complete picture of industrial conflict therefore requires a consideration of two factors: what the people involved really want; and how they see the facts of the situation.<sup>3</sup> The same motives may in one instance be seen as demanding union action, slowdown or strike, and in another instance they lead to cooperation with management. From a practical viewpoint, management and union alike cannot change their motives; but it is possible to try to convince the workers that the facts are such as to call for certain action in pursuit of satisfaction. In either case, close knowledge of what the workers really want, right now, is important.

**Ego as Basic Motivation.** The evidence we have presented from industrial studies favors the modern theory of motivation now widely accepted by American psychologists. While this can be stated in different ways, the essential idea is this: man is concerned about his status. He wants enough food, clothing and the like to protect him from hardship, but beyond this, he will be trying to keep or improve his standing in the community. How he compares with others, and how he compares with his own ambition, are the crucial questions. Economic motives, then, may in some cases be significant and not in others. Surprisingly often, they are not. Ego-satisfactions frequently have more attraction power for the worker and the executive alike.

It is the power of injured egos to motivate persistent, stubborn defense and revenge which underlies a great many strikes and even more conflicts

<sup>2</sup> Description by a participant.

<sup>3</sup> The "facts" are not the same to workers and managers. For further discussion of this, see the preceding article in this series, *Personnel Psychology*, Vol. 1, No. 2, pp. 131-145.

which do not flare into open hostility. It is the demand for more power by workers and their unions, the fight to protect status and power by company officials, which is crucial to modern industrial relations.

In the 1946 General Motors strike the union bolstered its plea for wage boosts without price increases by challenging management's right to keep information concealed, with the slogan "A look at the books." General Motors countered with the apt phrase, "A finger in the pie" to show what was implicit in the union demand. Psychologists will suspect that General Motors was right. The basic conflict is over self-assertion, over the right of the executive to independent decision versus the right of workers to challenge that decision or change it. "A finger in the pie" is an inevitable goal of union policy, however much union spokesmen may disclaim any such idea.

**Capitalism Strengthens Ego Motives.** We may be pardoned for asking if any other result could be expected. Ours is a competitive, ego-centered culture. Our philosophy and our advertising alike stress achievement, prestige and power. "Superman" is no accidental hero; his adventures canalize the desires of American youngsters in a pattern that fits our society. We cannot expect executives to be the only persons craving free self-expression, enhanced status, a sense of planning and doing worth-while things. Workers imbibe these influences and crave these goals—less intensely, less unanimously, but regularly.

The problem of industrial conflict is the problem of democratic self-assertion versus self-assertion without democratic controls. Executives want ego-satisfaction; so do workers. The problem of industrial harmony will not be solved until we develop techniques for sharing these ego-goals.

Perhaps as good a way as any to sum up this idea is to quote a union organizer on the subject of a recent strike in a small Illinois factory. Asked what the real issue was, he replied: "The real issue wasn't the 15¢ an hour we asked for or the 5¢ we got. The real cause of the strike was that we had to convince that guy he couldn't be a little dictator any longer."

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## 2. Employee Groups: What Motivates Them and How They Perform

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*Daniel Katz*

Reprinted from *Advanced Management*, 1949, 14, #3, 119-124, by permission of the author and of The Society for The Advancement of Management. In this article Dr. Katz discusses the work of the Survey Research Center at the University of Michigan on group functioning and group motivation in industrial situations. Studies involving the uses of advances in methodology in the field of social psychology suggest that workers are more effectively motivated when they are allowed to participate in decision making.

In a machine age with specialization of function and with huge populations we survive through our ability to organize our mutual interdependence. The task of organizing people so that they can work effectively toward a group goal has become a major problem of our time. Yet the total amount of scientific research devoted to the psychological factors in group functioning is slight compared to the amount of research in problems of technology. In fact, we have forgotten that group organization is essentially a study of the psychological relations between people. We tend to abstract from human relationships the standard institutional practices and regard them as entities existing apart from human beings.

The theoretical and practical importance of more scientific study on group motivation and group functioning has led to the popular concern with human relations in industry and has given impetus to new programs of research. The Survey Research Center of the University of Michigan, with the aid of the Office of Naval Research, has embarked upon a series of studies designed to contribute to the knowledge of morale, leadership and performance in group activity.

This program of research has so far given major emphasis to three aspects of the problem: first, the determination of the psychological conditions that make for a high level of group performance; second, the dimensions of

effective group leadership; and third, the dimensions of group morale or group motivation. In emphasizing the social psychology of group organization this program is in the tradition of the Hawthorne studies conducted by Mayo, Dixon and Roethlisberger. These earlier investigations demonstrated that group performance was related to the informal group structure existing in a plant—that is, in addition to the formal organization as shown by the organizational chart, there were patterns of inter-personal relationships that developed spontaneously and were directly relevant to the activities of group members. For example, a group of workers might develop informally among themselves a production standard beyond which members of the group did not go.

The research program of the Survey Research Center is, however, not concentrating upon informal group structure but is trying to cover many aspects of the working situation. Its major point of departure is in its use of advances in methodology in the field of social psychology. It relies heavily upon quantitative measuring of psychological variables. Worker satisfaction and motivation are systematically measured through interviews in which attitudes and responses are coded and scaled. These measures then can be related to similar coded material from managers and supervisors as well as to objective data such as productivity records.

**A Study of Productivity among Clerical Workers.** The first study in the series was conducted in the home office of a large insurance company in departments in which clerical workers service policies. In these departments there were parallel divisions carrying on the same type of work, using the same work methods and having the same flow of work. Since these divisions and the sections within them had group productivity measures, the differences in productivity between the work groups were a function of the social psychology of the situation and not of technology. High and low producing sections were matched on the basis of type of work. All employees in matched sections were interviewed intensively in sessions lasting between forty-five minutes and an hour and a half. The supervisors of these sections were also interviewed at even greater length. In addition, the managerial hierarchy was interviewed up to the fourth level of supervision.

The interviews, though of the open-ended or narrative type, followed a standardized form that was designed to get at specific dimensions of beliefs, practices and motives. The replies were recorded verbatim by interviewers and were reduced to quantitative scales by the coding department of the Survey Research Center. This coding process consists essentially of two steps: the definition of the major classifications of the material, and the determination of the specific categories under each major classification. To make sure that the assignment of answers to categories is not a function of the subjective judgment of one coder, a number of coders make independent judgments.

**Importance of Supervisors' Attitudes.** The major differences in high and low producing groups in this company were in large part related to supervisory practices and attitudes. The supervisors with the higher producing sections in general were following a more liberal philosophy of management. They were giving more attention to the problem of motivating their workers. Specifically, the first-line supervisors in the higher producing groups were under less close supervision from their own supervisors, placed less direct emphasis upon production as the goal, encouraged employee participation in the making of decisions, were more employee-centered, spent more of their time in supervision and less in straight production work, had a greater feeling of confidence in their supervisory roles and felt that they knew where they stood with the company.

These findings are consistent with the experiments of Kurt Lewin and his followers, which have shown that people are more effectively motivated when they are involved in decision-making and when they are given some degree of freedom in the determination of their own activity. These findings are consistent with the psychological principle that participation is an important factor in learning and motivation. Many of us can remember that as undergraduates we worked more energetically in our own extra-curricular activities than in formal courses.

**Findings Contrary to Usual Belief.** Nevertheless, these findings run counter to certain well entrenched beliefs as well as common-sense expectations about the type of work situation being studied. The usual assumption in routinized industry is that workers must be motivated by external rewards and penalties. It is even asserted that the average worker does not like responsibility or decision-making. The example is often cited of the worker who did not like the task of sorting good from bad apples because he had to make too many decisions. Moreover, in a regimented industrial situation it is assumed that the many rules prescribing behavior and the minimal degree of local autonomy make for a clear, stable and predictable situation. In this system people know what is expected of them, what they can and can not do, and from what source to expect a given kind of order. Within this type of culture it might be expected that the introduction of a small amount of freedom could produce conflict and uncertainty. Almost any system can be functional if it is internally consistent. Nevertheless, in the company under study, the supervisors who departed from the logic of the system and gave their workers more freedom and responsibility enjoyed higher productivity.

**Ideals of a Democratic Society.** The answer can be found, in part, in the larger social picture. The ideals of a democratic society have been publicized in our culture for so long that they have gained more and wider acceptance. It is becoming increasingly difficult for people to accept the notion that they are mere cogs in a machine and that their aspirations toward self-expression and self-determination are unrealistic. There has been a slow evolution in

the family and in the home so that children are brought up in less of an authoritarian pattern. In short, the old-fashioned philosophy of management ("Tell them nothing!" "You're not paid to think around here") is encountering resistance because of the social history of the past fifty years. It is common to find fault with the home training of the modern generation as the cause of most of our problems. This criticism, however, misses the essential point that changes in home training are but one reflection of the total cultural change taking place since the French Revolution. It is interesting, incidentally, that an imaginative realization of the deep-lying significance of historical trends appears in industry itself. William Blackie, Vice President of the Caterpillar Tractor Company, in an address "Management and Human Relations," delivered before the Ninth Annual Congress on Industrial Health of the American Medical Association at Chicago on January 18, 1949 said: ". . . the change which has been occurring in industry is not like that which occurred in the physical upheaval of the industrial revolution. It is a change in the mode of thinking about people—a change in attitude—becoming deeply planted and likely to be far-reaching in its consequences. It rests on an enhanced and enlightened appreciation that the inner strength of democracy is, as British Ambassador Sir Oliver Franks so well termed it, 'derived from three ideas—the value of the individual human personality, a real sense of belonging, and the basic like-mindedness of society which is the root of democratic life.' "

The results from this study also indicated fewer differences in worker attitudes between high and low groups than might have been expected. The only major difference was pride in work group, with the higher producing sections having more pride in their own work group. In this situation, however, we were not dealing with large differences between high and low groups. Moreover, many of the conditions under which the two groups functioned were alike. For example, they were all under the same wage policy, the same promotional policy, the same working conditions, the same company benefits. And finally, the personnel in these two groups were, for the most part, similar in background, education, aspiration and thus tended to have similar values.

One finding from this study suggests that group morale is not a unity but is made up of different factors. For example, intrinsic job satisfaction—that is, the satisfaction workers derive from doing the work itself—is definitely related to the type of work they are doing but is not necessarily related to their identification with the company for which they are working. Satisfaction with the company, however, seems to be much more a matter of their own personal values—that is, it depends on whether the overall situation the company sets up is one in which they find satisfaction. Pride in one's work group seems to be related to actual productivity and to first-line supervision but it does not always transfer to a liking for the

company as a whole. Satisfaction with wages and with promotion opportunities bears a relation to the expectations of the going rate for the industry and for the community.

**Supervision and Leadership.** The findings from this first study are being tested in a variety of different industrial situations. To date, the results suggest a number of additional principles concerning supervision and group motivation. The broadest formulation of the findings, as they concern supervision, emphasizes the differential role played by the leader in the work group situation.

In all the industrial situations studied, one common result is that the poorer supervisors, the men in charge of the groups with lower productivity or lower morale, tend to be the people who have not assumed the larger functions of leadership. They have tended to remain production workers or they have tended to take on the less important functions of the leader—the mechanical or institutional duties of keeping the paperwork in order and attending to the mechanical details of their jobs. They do not give sufficient attention to the planning function of their jobs. For example, in a study of maintenance-of-way sections on a railroad, the foremen in charge of the more productive groups did more long-range planning whereas the foremen in charge of the less productive groups tended to do little planning or to plan from hour to hour.

Another characteristic of the good supervisor is his appreciation of his job as one of understanding and motivating people. The simple measure of the amount of time given to personnel duties and to the broader aspects of supervision differentiates between poor and good supervisors. The weaker supervisor resembles his more able colleague in that he will make work assignments, keep his men supplied with tools and materials and enforce the rules; but he falls down in training his men for better jobs, keeping them posted on how well they are doing and, in general, motivating them through positive methods of personal recognition.

The failure of the first-line supervisor to take over the larger functions of leadership in the work group has, apparently, many causes. It is sometimes due to the promotion of old and loyal employees who have built up through the years habits for production but not for supervision and who have had no real training in leadership. It is right and proper for them to be rewarded for devotion to their production duties but the reasons for which they are being promoted do not necessarily insure the qualities that make for good foremen.

This suggests another basic factor—the lack of adequate training for leadership. Lack of proper training may be a weakness of the foremen's boss or a weakness of the company program. There is some evidence to suggest that the formal training courses for supervisors have limited value. These courses may impart some knowledge but they do not change the funda-

mental attitudes of personality that may need to be changed for effective leadership nor do they necessarily produce in the foremen the actual skills that are needed for the job. Professor Norman Maier, who has developed a new type of training program for changing the personality orientation of supervisors, states in the "Industrial and Labor Relations Review" for April, 1948: "Unless a supervisor's attitudes toward the rights of employees are changed, training in new procedures requires him to act out a role. Human relations techniques then become a cloak to be worn when problems arise. Thus training which does not change fundamental attitudes becomes nothing more than a sugar-coating for the supervisor, and this coating is either recognized as such by employees or soon wears off."

In interviewing supervisors it is not uncommon to find that the person interviewed talks convincingly and is familiar at a verbal level with principles of human relations. When he is questioned more specifically about some of his own tough problems he frequently shows that he has not translated these principles into operating skills. There is growing recognition of the need for the type of training that will not only impart information but will also change attitudes and develop skills.

Another difficulty of the first-line supervisor is the change that has occurred in his institutional role over the years. With the growth of union organization and with the development of personnel departments he no longer has hiring and firing functions and in general has lost his former range of authority. This has been accentuated by the fact that as men move up in the company they often take important parts of their old jobs with them. This further increases centralization of power at the top.

The foreman, moreover, is familiar with the more simple leadership of the older situation that was one of merely giving orders. His new position calls for a redefinition of his role. The part he must play now to be an effective leader calls for a radically new type of functioning. He must now conceive of himself as a true rank-and-file leader, not as a company autocrat. As a leader of his own men he needs to be a capable representative of their true interests to his superiors and he needs to involve them in the decisions remaining with him. He still has the unique position of being the most important communication link between management and employee. He still has opportunities to see that the over-all rules of the institution are translated into action at the local level with wisdom and flexibility.

**Making Use of Research Findings.** One new type of project the Survey Research Center has been carrying on has been the utilization of research findings. The results of research studies should not only add up to a fund of scientific knowledge. There is also the problem of making use of them in situations where they can do the most good. Such use, however, involves changing the habits and attitudes of people if company practice and policy are to change. The study of how research results can be used to change

people is both important in itself and capable of sharpening our knowledge of the principles discovered in the original surveys.

In one concern where a large-scale survey had been made, the results were introduced into the company in an effort both to help solve administrative and personnel policy problems and to gain insight into the process of social change.

The procedure followed in this experimental effort to put research findings to use made four major assumptions:

1. In hierarchical structure it is important to start the change process at the very top. Unless top management is interested and favorably inclined toward the change, it will be difficult to produce any lasting effect.

2. It is necessary to involve two or more levels of the hierarchy at the same time. This insures the continuing interest of the line organization.

3. Change will come about more readily if the line officers of the company become involved in the research process itself. This does not mean that they replace the research expert but rather that they consider the meaning of the first results and make suggestions about the type of factors that seem to be likely causes. This, then, gives the research analyst the opportunity to work out additional cross tabulations for further discussion with the company people. This process has two advantages: (a) It takes problems out of their traditional and, perhaps, emotional context and puts them in an objective framework. The company officers are forced to give full attention to the reasons for some of the operating difficulties in the human relations field on the same basis that they regard problems on the engineering side. (b) The suggestions of the line officers are valuable to the research worker since they represent long experience with the immediate problem. The research analyst can therefore do a more complete job in working out the implications of his data.

4. The material should be introduced in group sessions by the line people in the company so that the group of subordinates can become involved, its thinking stimulated and its potentialities tapped.

In carrying through the above procedures many of the departments of the company have become intensely interested in the research findings, in discussing the causes for weak spots in group morale and in finding remedial measures. In some cases the group process by which a department head involved his workers helped to solve the problems. It is still true, for example, that much by-passing occurs in industry and that the inability of higher officers to permit their subordinates to carry out delegated responsibilities can disrupt morale. By a group consideration of morale of subordinates, the officer who habitually by-passes his men is brought into communication and contact with them. He discovers to his surprise that his subordinates know a lot about the weak morale spots in the organization and even have valuable suggestions for improving the situation.

**Studying Labor-Management Relations.** Still another type of study in the industrial field concerns the area of labor-management relations. Many uni-

versities have now set up industrial relations sections staffed largely from departments of economics. These organizations have been doing excellent work on labor and management problems and the Survey Research Center of the University of Michigan plans to supplement this growing body of research with quantitative studies of workers and management, beginning at the local or plant level. It is true that industrial conflict and industrial peace need to be understood in terms of the structure of the national organization of labor and of industry, but the day-to-day contacts of labor and management in a given plant also add to our knowledge of labor-management relations.

Within the broad framework of policy determined by strategic patterns of industry-wide organizational relations of union and management there will be plants in which the local unions get along well with management and plants in which management and the local unions are at swords' points. Some of these local differences may reflect the pace-setting or pace-following nature of a given company, but some of them may be related to the immediate social psychology of the situation.

The Survey Research Center has thus far completed one study in this general area of labor-management relations in which the emphasis was placed on the local situation. The foremen and their supervisors, as representatives of management, constituted one group for study. The union stewards and their superiors constituted another group and a cross-section sample of rank-and-file workers constituted a third group. A series of questions were directed at the following objectives: (1) To what extent do these three groups accept management's goals and values? (2) To what extent do these three groups accept union goals and values? and (3) To what extent do they see the union and management goals and values as compatible?

These measures of identification with union and management were then related to, first, data obtained on the way in which foremen and stewards handle the men under them; second, the degree to which foremen and stewards, working in the same department, get along together; and third, the job satisfaction of the workers.

**More Agreement Than Disagreement.** The analysis of the material suggests that within the plant studied there is much more agreement than disagreement on basic issues. The majority of workers, of stewards and of foremen tend to see the goals of union and management as compatible. In general, the foremen tend to have more doubts about the ability of union and management to get along than do stewards and workers. The ability of foremen and stewards in a given department to work out a stable pattern of relationship has an important influence upon the attitudes of the rank-and-file workers. The departments in which the power position of the steward is relatively great is not necessarily the department in which there is less identification with management. Identification with management

seems to decrease as the stewards and foremen in a given department are in conflict about their power roles.

The findings from this study suggest that, at local levels, acceptance of company and union goals and the degree of perceived conflict between them does bear a relation to the inter-personal relationships of foremen and stewards and workers.

The research program of the Survey Research Center on human relations in group organization is still in its beginning stages and the plans for its development envisage research in many different types of industrial situations, as well as field experimentation in which findings are put into practice on an experimental basis. Thus far the results suggest the importance of a new orientation to problems of group organization—an orientation along the lines described by James Worthy in his thoughtful article in the March, 1949 issue of this journal in which he observed: "The purpose of a human organization, whether business or otherwise, can only be defined in terms of the people in it, because unlike the component parts of a machine the people who comprise a human organization are something more than just parts of that organization. They are flesh-and-blood men and women, with sentiments, ambitions and needs of their own which range far beyond the confines of the organization of which they may be a part, and the extent to which they serve the needs of the organization willingly and enthusiastically depends upon the extent to which the organization serves their needs as sentient, aspiring human beings."

### 3. Organizational Structure and Employe Morale

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*James C. Worthy*

Reprinted from *American Sociological Review*, 1950, XV, 2, 169-179, by permission of the author and of the American Sociological Society. A comprehensive report of studies carried out at Sears, Roebuck and Company which points to the conclusion that employee morale and operating efficiency are related to the degree the organization is integrated.

**1. Introduction.** This discussion will review some of the findings of the research conducted by Sears, Roebuck and Co. in the field of employe attitudes and morale. This research is an integral part of our company's personnel program; its primary purpose is to assist executives in their efforts to maintain sound and mutually satisfactory employe relationships. Such relationships are conceived by our management not only as a positive good in

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themselves but as an essential condition for the continued economic success of the enterprise.

We have had 12 years of experience in the formal study of employe morale. During that period our surveys have covered over 100,000 employes, working in several hundred different company units both in Sears, Roebuck proper and in a number of other organizations as well. Types of employes covered include sales and clerical personnel, manual and professional workers, supervisory employes, and executives. The size of units surveyed has ranged from fewer than 25 employes to more than 10,000. Many different types of units have been surveyed, including retail stores, mail order plants, factories, warehouses, and offices. The geographical distribution of employes covered would correspond rather well with the geographical distribution of the U.S. population. By the same token, the communities in which units surveyed have been located cover practically the full range of sociological and cultural categories to be found in this country, except the small town and the rural.

**2. Methods of Study.** Time does not permit any detailed account of our survey methods; however, some brief explanation is necessary if only to indicate the extent to which confidence can be reposed in our findings.

Our original surveys were based solely on questionnaires, which were answered anonymously by employes. The questions covered a great variety of subjects—practically every subject, in fact, which we thought likely to have any influence on employe attitudes. In other words, the questionnaires had the simple, straightforward purpose of finding out how well employes liked their jobs, what their attitudes were toward supervision and management, and what factors in their employment situation might be contributing to dissatisfaction or poor working relationships. We assumed that when we had learned these things we would be able to take specific action to correct specific problems and thus restore peace and harmony where any lack thereof was found to exist.

We did find certain things that were susceptible of direct management action, but we also found many things that were difficult to take hold of. It soon became apparent that we were dealing with an infinitely complex system of influences and relationships, and not with a simple system of logical cause and effect. We began to question the adequacy of questionnaires and found, as we analyzed thousands of employe responses, that we could not even be sure we were asking the right questions or asking them in the right way.

Finally, there were real difficulties in attempting to analyze the significance of questionnaire responses. What was a "good" score on a certain point? Was a 65% "favorable" response to a question about employe discount policy equivalent to a 65% "favorable" response to a question about wage rates? Beyond certain relatively superficial points, there was often great

uncertainty as to just what the tabulation of responses meant and what, if anything, could or should be done about it.

We have handled this problem by developing quite a different type of questionnaire and by supplementing it with other techniques (notably interviewing). Instead of covering a great many specific points, the questionnaire we now use seeks only to determine the general "feeling tone" of employes with respect to six key aspects of their working environment: (1) the company in general, (2) the local organization, (3) the local management, (4) immediate supervision, (5) fellow employes, and (6) job and working conditions. Ten items are included under each of these headings on which employes can express varying degrees of satisfaction or dissatisfaction. In scoring, we are not concerned with responses to each particular item in the questionnaire, but rather with the *general tendency* of responses in each of the six areas. In this respect, the questionnaire is patterned after the familiar "interest" or "personality" schedules used in psychological testing. As with such schedules, our questionnaire results can be expressed in "profiles." Furthermore, we have enough "cases" (i.e., units surveyed) to be able to translate raw scores into percentiles, thus greatly facilitating the process of interpretation and comparative analysis. As our survey people gain more experience in relating different types of profiles to concrete situations, they are developing real skill in using questionnaire results as a diagnostic tool.

The function of the questionnaire is not, however, to secure detailed information, but rather to "take the temperature" of an organization and its various subdivisions, to determine whether the general level of morale is high or low, and to point out areas of stress and strain which may be tending to undermine cooperative working relationships. In other words, by means of the questionnaire, we are able to locate problem departments and to identify the general nature of employe dissatisfactions. Only within broad limits, however, does the questionnaire tell *why* morale may be low. The real task of determining the "why" falls to a team of carefully trained interviewers. Because the questionnaire has already indicated the general nature and location of problems, the interviewing team is able to concentrate its time and energies on those departments and employe groups most requiring attention.

Surveys are conducted by members of the company's regional personnel staffs, with technical direction and coordination from the national personnel office in Chicago. (Administrative control of survey activities is strictly a regional responsibility.) People conducting the surveys receive special training in non-directive interviewing and in certain aspects of sociological and anthropological theory which we have found to contribute meaningfully to understanding the problems of organizations. In large part, they are trained by the case method, not only through studying reports dealing with "classic" situations (of which by this time we have a fair variety) but also

through participating directly in survey work under the tutelage of experienced survey personnel.

In this connection, it should be noted that the entire survey program makes extensive use of clinical methods, not only for training younger practitioners, but for analyzing the significance of survey results and for working out necessary corrective measures with the executives responsible for the operating units involved. The participation of line executives, with their intimate and long-standing knowledge of their own organizations, in these "clinical sessions" has contributed greatly to both the pragmatic value of the survey program and the growth of knowledge and understanding on the part of survey personnel. Valuable as our extensive statistical data has been and is, most of the insights and hypotheses which the program has produced have been an outgrowth of this clinical approach.

Thus, the scope of our survey program has broadened significantly since its inception 12 years ago. We have found that there is more to good morale than high wages and pleasant working conditions (although these are of unquestioned importance). We have learned that effective leadership involves more than "winning friends and influencing people" (although social skill is an essential ingredient of executive capacity). It has gradually become clear that to understand what might be taking place within any particular working group we must have some knowledge of a variety of factors both internal and external to the group itself, and that, above all, we must have some dynamic conception of the manner in which these factors relate themselves one to the other and to the total situation of which each is an influencing and influenced part.

The scope of the surveys has thus been broadened to include the functioning of the organization as a whole and the entire pattern of technical processes and formal and informal relationships which comprise it. To the extent permitted by practical operating considerations, community and regional factors are likewise taken into account. In recognition of this broader scope, our surveys are no longer known as "*morale surveys*" but as "*organization surveys*." Determining the level of morale has ceased to be an end in itself and is now useful chiefly as a means for diagnosing the problems of an organization. Above all, our survey teams seek to deal not merely with the superficial manifestations of problems, but with the basic influences which have created the problems.

Surveys are concerned not merely with discovering the nature and origin of difficulties; their primary purpose is problem-solving. To this end, the survey team attempts to give the local manager a more complete picture of his organization and the way it is functioning, and to help him understand the various factors operative in his particular situation and their effects, not only on the attitudes and behavior of his people, but on the efficiency with which his organization is functioning. With this clearer picture of his organi-

zation, the manager is in a better position to take constructive action directed at the root of his problem rather than its superficial symptoms. However, the long-range objective of the survey program is not so much to correct immediate situations as to assist in developing the kind of organizations that can solve their own problems. A survey has failed in this essential purpose unless it leaves the particular store, plant, or department stronger and more self-reliant than it was before.

Our survey program is thus primarily an administrative device: its chief function is to assist local executives in doing a better job of handling the problems of their organizations. However, the surveys have also provided highly useful information about certain fundamental problems of human relations. One of the responsibilities of the research and planning staff of the national personnel office is the constant analysis and evaluation of survey data and the development of working hypotheses based on these data. Time will not permit any general review of our findings to date, but I would like to indicate some of the general directions of our current thinking.

**3. A Problem of Integration.** One line of thought on which we are working is the possibility of developing a typology of the malfunctioning of organization which can be useful in studying social groups as the typologies used by psychiatrists are useful in studying the malfunctioning of personality. This possibility was first suggested by the frequency with which the questionnaire "profiles" tended to form themselves into patterns with which we began to grow familiar. Our interviewing, likewise, attested that certain types of problems tended to occur in fairly well organized syndromes. For instance, we have found that certain kinds of difficulties typically follow changes in key management staff. We can usually predict not only what difficulties are likely to occur but the exact sequence in which they are likely to appear.

A typology of the malfunctioning of organization would be useful not only for scientific purposes but for administrative purposes as well, for with it could be developed a symptomatology by which problem situations could be diagnosed and acted upon more rapidly and more accurately. As already pointed out, our survey program is primarily an administrative device. Useful as it has been for this purpose, it has certain unwieldy features because sometimes it has to go a rather long way around to reach a fairly simple conclusion. For administrative purposes, we would be far better off if we had a group of people (preferably our administrators themselves) skilled at recognizing and diagnosing symptoms and dealing with the problem thus defined according to whatever therapy had been found useful for that particular type of difficulty.

It would be even more useful to be able to predict with reasonable accuracy the probable consequences and to set in motion early a series of moves designed to minimize any adverse possibilities. We are able to do precisely this on a number of counts (for instance, cases of key executive changes) and

our success here encourages us in our efforts to broaden the area in which we can predict with confidence.

As to our survey program as a whole, we are, as things stand now, somewhat in the position the medical profession would be in if the physician had to give a basic metabolism to determine whether a patient had a cold in the head. To continue the analogy, if we had a workable symptomatology (no matter how tentative), we could recognize the head cold and treat it accordingly. On the other hand, if the symptoms in the case indicated a more dangerous or more complicated disability, we could always apply our equivalent of the basic metabolism or such other procedure as the circumstances might require.

Any typology of malfunctioning must relate, of course, to the underlying dynamic system and not merely to the symptoms. All of our research testifies to the frequency with which the identical symptom can arise from entirely different factors. In one context, complaints over wages can be a danger signal; in another, merely an indication of the normal desire of everyone to be making a little bit more than he is. Sometimes, complaints over wages can really be complaints over wages; at other times, they can be merely a convenient target against which to direct verbalizations of resentment that arise out of situations that have little to do with wages. Because of the unreliability of symptoms taken in isolation we have found it more and more useful to think in terms of syndromes. The fact that our questionnaire is so constructed as to yield results in the form of profiles has greatly aided this purpose.

The psychiatrists have found the concept of *integration* a useful one around which to organize their ideas about personality and its disorders. We think a similar concept, related to group phenomena, could form the basis of a useful typology of the malfunctioning of organization. Certainly, the degree of integration (internal and external) of any organization relates very directly to the underlying dynamic factors in operation. One type of failure of integration leads to one type of difficulty which is different from that likely to arise from another type of failure of integration. Moreover, the methods for dealing with the two sets of circumstances are likely to differ, although often many of the superficial symptoms may be identical.

The scope of this paper does not permit a systematic exposition of the concept of integration. One of its aspects, however, is suggested by consideration of the problem of size of the organizational unit. Our researches demonstrate that mere size is unquestionably one of the most important factors in determining the quality of employe relationships: the smaller the unit the higher the morale, and vice versa. It is clear that the closer contact between executives and rank and file prevailing in smaller organizations tends to result in friendlier, easier relationships. To employes in such units the "big boss" is not some remote, little-known, semi-mythical personage but an

actual, flesh and blood individual to be liked or disliked on a basis of personal acquaintance.

In broader terms, the smaller organization represents a simpler social system than does the larger unit. There are fewer people, fewer levels in the organizational hierarchy, and a less minute subdivision of labor. It is easier for the employe to adapt himself to such a simpler system and to win a place in it. His work becomes more meaningful, both to him and to his associates, because he and they can readily see its relation and importance to other functions and to the organization as a whole. The organization operates primarily through the face-to-face relationships of its members and only secondarily through impersonal, institutionalized relationships. The closer relations between the individual employe and the top executive in such a situation are only one aspect—but an important one—of the relatively simple and better-integrated social system of the smaller organization.

The importance of both external and internal integration is emphasized by other findings of our surveys. One of the most suggestive of these is that morale tends to be substantially lower in the large, industrialized metropolitan centers and higher in the smaller and less complex communities. For closely related reasons, morale tends to be lower in the Eastern sections of the country and higher in the West and South. Likewise, the simpler the industrial base of the community and the more homogeneous its population, the higher the level of employe morale.

These factors obviously relate, by various means, to the social characteristics of employe groups, and these social characteristics have an important bearing on the problem of integration. In certain cities of the South, a high percentage of employes grew up in small towns or in the country. Often their first job, after migrating to the "big city," is with our company. A great many of these young people have had religious upbringing which, together with parental admonitions, emphasizes the rightness of hard work for its own sake and the moral obligation of the employe to give his employer a full day's work for a fair day's pay.

Employes of units in large metropolitan centers, particularly those located in the East, are likely to have somewhat different social characteristics. Instead of coming from smaller towns and rural communities, most of them are likely to have originated within the metropolitan area itself. Likewise, many of them are likely to be the children or grandchildren of foreign-born stock whose personalities have been strongly molded by the special circumstances and influences of growing up within ethnic communities. The marked tendency toward lower morale among employes drawn from such groups seems, in part at least, to reflect the high degree of social disorganization characteristic of the great metropolitan agglomerations.

An important element of this disorganization is the tendency for sharp cleavages to develop between different groups comprising the community,

and one of the most significant of these cleavages is that between workers and management. Where the rank and file members of an organization have been drawn largely from working class homes in which factory employment has been the chief means of family support for two or three generations, their patterns of thinking and systems of value will be those of the urban working class. One characteristic of their way of life, growing out of their family and neighborhood experiences and traditions, is often a latent or overt distrust of the employer and a strong tendency to identify their security and well-being with their fellow-workers and not with the employer. The management of an organization employing large numbers of people with this type of background is thus likely to involve complications seldom encountered in what is sometimes described as the "less mature" regions of the country.

The problem, however, is by no means an insuperable one. No better testimony is needed than the survey showings of many of our own company units. Despite the fact that in some locations employes may be drawn from backgrounds representing all that is worst in social disorganization, morale in many such units is unusually high. A thoroughgoing urban working class background on the part of the rank and file is significant chiefly because it tends to create attitudes and values which do not correspond fully with those usually characteristic of management and executive groups, and because this difference in outlook frequently leads to *mutual* misunderstanding and lack of confidence. Under these circumstances, not only are management's action and motives frequently misinterpreted by the rank and file, but management itself is often at a loss as to ways and means by which it can effectively mobilize the interest and cooperation of employes in achieving the aims of the enterprise.

This gap can be bridged—and our surveys provide striking proof of that fact—by *skillful and understanding leadership operating in an organizational structure which facilitates rather than inhibits effective integration*. Both leadership and structure are of crucial importance. The structural aspect, however, has received relatively less attention. Moreover, there are a number of curious and significant interrelations between type of structure and character of leadership that will bear close investigation.

**4. Organizational Structure.** The results of our research suggest that over-complexity of organizational structure is one of the most important and fundamental causes of poor management-employe relationships in our modern economic system, and that until this problem is faced and corrected no substantial improvement in those relationships is likely to be possible.

In viewing many business enterprises, one cannot but be impressed by the number of different departments and sub-departments into which they are divided, and the extent to which the activities of both individuals and groups have been highly specialized. In a very large number of cases, employes perform only elementary, routine functions because jobs have been

broken down "scientifically" into their most elementary components. The resulting specialization undoubtedly has certain advantages, such as requiring less skilled people, shorter training time, etc. In many cases, however, the process has been carried to such extremes that jobs have little inherent interest or challenge; operations have been reduced to the simplest possible repetitive level and the worker makes nothing he can identify as a product of his own skill.

One has the feeling of division of labor having 'gone wild, far beyond any degree necessary for efficient production. Peter F. Drucker, in a penetrating analysis, has pointed out that over-specialization is not an inevitable consequence of mass production and that, "The traditional assembly line is simply a piece of poor engineering judged by the standards of human relations, as well as those of productive efficiency and output."<sup>1</sup>

The evidence of the studies conducted in our own company strongly support this conclusion, for we have found that where jobs are broken down too finely we are more likely to have both low output and low morale. Conversely, the most sustained efforts are exerted by those groups of employes who perform the more complete sets of tasks (e.g., salesmen, supervisors, master mechanics, etc.), and these likewise exhibit the highest levels of morale and *esprit de corps*.

The sharp trend toward over-specialization in our economy has not been limited, of course, to individual jobs. Just as particular activities have been broken down into their simplest possible components and each component assigned to a different person, so many *operations* (often after having been highly "simplified") have been separated out of the broader complex of activities of which they are a part and set up as specialized and semi-independent organizational entities. While over-specialization of individual jobs is serious enough, this over-specialization of the functions of entire departments and sub-departments has even more far-reaching consequences.

For one thing, it brings together in one place large numbers of employes on the same job level (and that level is likely to be fairly low where there has been any considerable over-specialization of individual jobs). This is another way of saying that the size of the administrative unit has been greatly expanded. Let us suppose an organization which performs three essential functions, A, B, and C. Let us suppose further that the volume of output requires three units of each function. Under these circumstances the organization could be set up in either of two ways:

1. It could be set up in three divisions, each function (A, B, and C) being represented in each division and each division, therefore, being a relatively independent administrative entity.

<sup>1</sup> Peter F. Drucker, "The Way to Industrial Peace," *Harper's Magazine*, November, 1946.

2. On the other hand, the organization could be set up in three *functional* divisions, one division having all three A units, another all three B units, and the third all three C units. In this case, none of the three divisions has any independence; each can operate only in closest coordination with the other two. Under the first alternative, there are really three administrative units; under the second only one, and that, by definition, three times as large.

This second type of arrangement is typical of much modern organization practice, both in industry and government. It is assumed that this separation and specialization of activities will permit better supervision, make possible smoother scheduling, and generally improve efficiency. There may be a certain spurious efficiency in this kind of organization but it is likely to have many off-setting liabilities.

One of the most serious of these liabilities is the fact that it so greatly expands the size of the administrative unit. Much of industry's present vast scale of operation is required not so much by economic or technical factors as by an unhappy and unnecessary principle of organization. The experience of many companies, of which my own is one, demonstrates that it is entirely possible to have many of the economic and technical advantages of large size without sacrificing too many of the essential human advantages of small size.

A further liability of over-functionalization is the fact that, from the standpoint of the individual employe, it tends to destroy the meaning of the job. He and those around him are working at highly specialized tasks which have meaning to management because they are a necessary part of a total process; he sees only the small and uninteresting part to which he and his fellows are assigned. In a real sense, the job loses its meaning for the worker—the meaning, that is, in all terms except the pay envelope.

Thus a very large number of employes in American industry today have been deprived of the sense of performing interesting, significant work. In consequence, they have little feeling of responsibility for the tasks to which they are assigned. Management in its efforts to maintain production in face of the resulting apathy is likely to resort to increasing supervisory pressure, but this procedure only creates more resistance on the part of employes. Sometimes the resistance is only passive, in the sense that employes fail to respond to the pressure or find means of avoiding it. Under certain circumstances, however, it can take more active form and lead to the creation of resistance groups in which employes band together (commonly through union organization) to exert a corresponding pressure against supervision and management.

Over-functionalization thus requires close and constant supervision at the work level to maintain production. Furthermore, the supervisors themselves must be closely supervised and controlled to assure the necessary degree of coordination between the many different units into which the organization

has been sub-divided. In a simpler type of organization structure, coordination can usually be achieved on a fairly informal basis because there are fewer artificial barriers in the form of departmental separations and lines of authority.

Where the work of the organization is broken down into so many functional divisions, however, cooperation can no longer be achieved spontaneously. After all, each functional unit was set up as a distinct entity in order that it might achieve a more efficient system. Each unit, therefore, tends to operate primarily in terms of its own systems rather than in terms of the needs of the other departments with which it must cooperate. Each unit becomes jealous of its own prerogatives and finds ways to protect itself against the pressure or encroachments of others. Conflict develops on the employe as well as the supervisory level, thus forcing an extra load on higher levels of management who must be constantly reconciling differences.

In order to achieve the necessary degree of coordination and cooperation between administratively separated functions, management is thus forced not only to build up an elaborate hierarchy of many supervisory levels, but to institute a wide variety of formal controls. Unfortunately, these controls are themselves often a source of conflict, because the individual supervisor or manager is under strong compulsion to operate in such a manner as to make a good showing in terms of the particular set of controls to which he is subject, and often he can do so only at the expense of impairing the service he is expected to render to other departments. This conflict is particularly acute when two closely related functions report up two different administrative lines and operate under two different systems of standards and controls.

The management of organizations which have been over-functionalized to the extent characteristic of much of modern business imposes a severe burden on the top administrative staff. Functions and activities have been so subdivided and specialized that no individual unit can operate except in closest coordination with others, and the system is often so complex that this coordination cannot take place spontaneously. If it is to occur at all, it must occur on the basis of specific administrative action from the top, which requires the development of a specialized staff to assist the top administrator.

This growth of staff complicates the situation still further, because an inevitable consequence is the elaboration of formal controls of various kinds to permit the staff to perform the functions and exercise the responsibilities which have been delegated to it or which it gradually assumes in an effort to strengthen its own position or extend its own authority. The result is a gradual undermining of the line organization for the benefit of the staff, an impairment of flexibility and adaptability, and a weakening of the effectiveness of the entire organization.

An objective appraisal suggests that to too large an extent work processes have been analyzed from a strictly "rational" or mechanical point of view

with too little attention to the human factors involved. As a result, functions have been separated out of their context and set up as semi-independent activities. Necessary collaboration and cooperation between the units thus artificially separated becomes possible only through an elaborate system of controls and a complicated administrative hierarchy. Under these circumstances, management necessarily becomes strongly centralized, despite the frequently expressed concern of business leaders over the need for greater delegation of authority and responsibility. Too often, this is simply impossible because the nature of the organization structure makes effective decentralization impossible. For much the same reason, such organizations often require from their top administrators a high degree of driving pressure to hold the system together and make it operate with a resonable degree of efficiency.

Where this is the case, executives and supervisors down the line quite understandably tend to pattern their own methods after those of their superiors. In many cases the copying may be done unskillfully and in such a way as to exaggerate the worst features of the pressure methods. As a result, supervisory methods at the middle and lower levels of over-functionalized organizations are often crude and inept.

Furthermore, the degree of pressure often required from the top is likely to create an atmosphere of anxiety and apprehension within the executive and supervisory group. This atmosphere tends to amplify the severity of pressure as it moves downward in the organization, so that even a moderate amount of pressure at the top is often greatly magnified by the time it reaches the lower levels. Attitudes of mind characterized by fear and apprehension are not particularly conducive to real skill in managing and leading subordinates. Above all, poor supervisory techniques at the lower levels of an organization generally reflect the experience and type of supervision to which the supervisors themselves have been subjected over the years and which they have come to accept as normal and expected behavior.

The significant point in all this, however, is that the over-complex, over-functionalized organization structure is likely to require the driver type of leader; the over-use of pressure as a tool of supervision is thus related primarily to the character of the structure and only secondarily to the character of the individual at the head of it. (On the other hand, it is recognized that the personality of the top man may have a great deal to do with the kind of organization structure he sets up. This entire problem of the reciprocal relationships between structure and personality should be studied carefully.)

**5. Systems Compared.** The most striking feature of the over-elaborate type of organization structure is its lack of integration, a deficiency which can be only partially and very unsatisfactorily overcome by driving pressure from the top. Our studies suggest that this type of structure is not only bad

human relations but equally unsound from a standpoint of productive efficiency. Our studies also suggest that alternative systems of organization are conceivable and eminently practical.

For one thing, we seriously question the necessity for much of our present high degree of over-specialization and over-functionalization. The so-called "scientific management movement" which has given such impetus in this direction is based to a considerable extent on an extremely inadequate conception of human motivation and social organization. It has tended to approach the problems of management from an almost purely mechanistic point of view and has tried to organize human efforts in much the same way an engineer might design a machine. Much of our present over-specialization is based on this type of thinking.

However, the experience of a number of companies indicates that individual jobs and departmental functions need not be broken down to this degree in order to achieve productive efficiency. Quite the contrary; their experience has been that both efficiency and morale are best served by keeping specialization to a minimum. The experience of these companies likewise indicates that organization structures and administrative hierarchies can be vastly simplified, thus making possible a far higher degree of decentralization of authority and responsibility.

In the course of our survey work we have had an opportunity to study a fairly wide variety of organization structures. We have been struck by the sharp contrasts between otherwise comparable units which differ mainly in the complexity of their organizational structure and in the degree to which authority and responsibility are effectively decentralized to those farther down the line. A review of some of these contrasts may be instructive.

In the more elaborate and complex organizations, the individual supervisor or executive is subject to constant control and direction and has little opportunity to develop the qualities of initiative and self-reliance. In systems characterized by extensive management decentralization, primary reliance is placed on the personal initiative and capacity of the people in the organization. There is usually a conspicuous lack of detailed supervision and of formal controls, and executives and supervisors (and to a large extent rank and file employes) enjoy considerable freedom in the way they accomplish their jobs.

They are judged primarily by their results, not on the details of the way they get those results. This concentration on end-results rather than on system and controls, together with management's alertness to recognize and reward good results, develops initiative and self-reliance and generates a far more powerful driving force than could ever be imposed from the top down. This pattern of administration not only gets today's job done better but permits the individual to grow and develop in a way that is impossible in more

centralized systems. Furthermore, it contributes strongly to morale because employes work in an atmosphere of relative freedom from oppressive supervision and have a sense of individual importance and personal responsibility which other types of arrangements often deny them.

A number of highly successful organizations have not only paid little heed but have gone directly counter to one of the favorite tenets of modern management theory, the so-called "span of control," which holds that the number of subordinate executives or supervisors reporting to a single individual should be severely limited to enable that individual to exercise the detailed direction and control which is generally considered necessary. On the contrary, these organizations often deliberately give each key executive so many subordinates that it is impossible for him to exercise too close supervision over their activities.

In this type of organization structure, the individual executive is thrown largely on his own to sink or swim on the basis of his own ability and capacity. He cannot rely to more than a limited extent on those above him, and these superiors, by the same token, cannot too severely restrict, through detailed supervision and control, their subordinates' growth and development.

Not all individuals can function effectively in this type of set-up. It requires a very large measure of self-confidence and personal capacity. The system tends to weed out those who lack these qualities in adequate degree. Those who are able to adapt to this type of organization, however, are likely to be not only better executives but also the type of people who can build and maintain teamwork and cooperation and a high level of employe morale, not so much because they consciously attempt to do so but because these results are a natural by-product of their ways of operating and a reflection of their own personalities.

On the other hand, in organizations characterized by many levels of supervision and elaborate systems of controls, the individual not only has little opportunity to develop the capacities of self-reliance and initiative but the system frequently weeds out those who do. Furthermore, those who survive in this type of organization are often likely, by virtue of the very qualities which enabled them to survive, to have personalities and ways of operating which do not make for greatest skill in building employe teamwork and cooperation.

An organization with few layers of supervision and a minimum of formal controls places a premium on ability to stimulate and lead. The driver type of executive, who functions through maintaining constant pressure and whose chief sanction is fear cannot operate as effectively in such an organization. In the more simple types of organization structures, where management has been effectively decentralized, an executive accomplishes results and moves to higher levels of responsibility chiefly to the extent that he is able to secure the willing, enthusiastic support of his colleagues and subordinates;

he does not have the "tools" (with which a more centralized system would to some extent provide him) to accomplish the result in any other manner. The outcome is not only a higher level of accomplishment but, at the same time, a more satisfying type of supervision and a higher level of employe morale.

**6. Conclusion.** Our studies have shown that employe morale and operating efficiency are closely related to the degree the organization is integrated. Integration is not necessarily achieved, however, when the organization meets the requirements of machine-logic. As a matter of fact, what may appear to be logical from a purely technical standpoint may run directly counter to the personal and social demands of employes. We have seen a number of organizations which have a logical technology, division of labor, and hierarchy of control but which are badly disorganized from the standpoint of the actual working relationships of the people involved. Such organizations are well-integrated only on paper. In actual fact, they are irritating and frustrating from the standpoint of employes and inefficient, troublesome, and costly from the standpoint of management.

Our research indicates that two trends in particular are making effective integration difficult and contributing to the progressive deterioration of management-employe relations. One is the trend toward increasing size of the administrative unit; the other, the trend toward increasing complexity of organizational structure. Both trends appear logical in terms of widely held theories of business organization, but in both cases improvements in mechanical efficiency are at some point over-balanced by losses in the willingness and ability of employes to cooperate in the system. Moreover, the larger, more complex organizations are likely to become unadaptive and rigid, and to find it difficult to meet the requirements of economic and social change.

Intelligent planning on the part of management in setting up the formal structure of organizations can do much to improve the quality of human relations in industry. Flatter, less complex structures, with a maximum of administrative decentralization, tend to create a potential for improved attitudes, more effective supervision, and greater individual responsibility and initiative among employes. Moreover, arrangements of this type encourage the development of individual self-expression and creativity which are so necessary to the personal satisfaction of employes and which are an essential ingredient of the democratic way of life.

## 4. The Management of Morale

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*Jack W. Dunlap*

Reprinted from *Personnel Psychology*, 1950, 3, 353-359, by permission of the author and of Personnel Psychology, Inc. It is the thesis of this paper that morale is not an abstraction but a concrete entity that is directly related to specific factors. Dr. Dunlap shows how these factors can be identified and the results used in bringing about greater production, improved quality, and increased profits.

The importance of morale has been recognized by military leaders for centuries. Industry, however, has concerned itself with the problem of employee morale only in recent times. Now modern management recognizes that the production and profits of a company are directly affected by the attitude of the workers. The management of money and machines is concerned with concrete things, and management is well versed in dealing with them. The management of morale, however, is a relatively new concept. Management is not well versed in this field, nor are the techniques of the professional worker in human relations fully developed. Nevertheless, a great deal of progress in thinking about morale and in developing techniques to measure it has been made in the last two decades. This article discusses the management of morale.

The fact that morale is intangible, just as the attitudes upon which it rests are intangible, has caused many employers to view morale as not subject to the normal laws of measurement and influence. Such is not the case; it is only necessary to approach the problem with the proper tools and techniques. This "chimera" concept of morale has not only baffled laymen, but has misled professional workers in industrial relations. Before morale can be influenced, it is necessary to know the specific points on which poor attitudes exist, the prevalence of these attitudes, and finally, the geographical areas in the plant in which the attitudes exist.

It is not sufficient to ask broad general questions, such as, "How do you feel about the ABC Company?, Do you believe ABC treats the employees fairly?" or "Do you feel management is sincerely interested in the welfare of the workers?" True, management can learn from such questions how the employees feel about policy, practices, and the company. Such questions have their place in an attitude study, but the replies to such questions only tell "how good" or "how bad." They fail to reveal the causal factors. They

do not indicate how management can proceed to influence undesirable attitudes.

The writer and his associates are convinced that morale is not an abstraction. Rather it is concrete in the sense that it directly affects the quality and quantity of an individual's output. One need look no further than one's self and compare his output on those days when he is "low" with those days when he is "high." If we grant that morale is related to specific factors, it should be possible to design studies to discover what these factors are.

It is proposed further to develop this argument and to present the reader with examples of how such questions can be framed. These questions and their responses demonstrate how morale directly affects both quality and quantity of production. Management can use this information to improve morale and to increase profits.

Attitude studies should be designed to probe into specific causes of dissatisfaction. This means that the questions must be designed to delve into the specific causes underlying on-the-job irritations. It is not sufficient simply to identify the causes of poor morale, the degree to which it exists, or even the areas in which it is most prevalent. These are, of course, important matters and often justify such studies. However, attitude studies should go much further. They should set forth the particular factors underlying morale which affect directly the quality and quantity of production. Management should demand that morale surveys result not only in better morale, but also in greater production, improved quality, and increased profits. These are legitimate objectives and must not be lost sight of.

The preparation of a morale survey designed to achieve these aims requires that the investigator have intimate knowledge of the plant in order to ask specific and critical questions. Further, the investigator must establish excellent rapport with the employees; otherwise, he cannot determine the questions to ask, nor judge the pertinence of the replies. The questions should be so interlocked as to make it evident if bias unduly enters the responses, and where possible, cross validation techniques should be employed.

Such studies have the major drawback of cost. They usually cost two to four times as much as a "canned" attitude study. Normally, this cost is offset many times over by the increased production, improved quality of the work and general employee satisfaction which result. Studies designed to meet these objectives might be called "Operational Attitude Studies" since they are concerned with on-the-job attitudes.

There are presented below five questions taken from a study on the improvement of inspection. The responses illustrate how employee morale, quality of product, and amount of production are interwoven. Three of these questions were given to production workers and two to a group of inspectors who checked the work of the production employees. In examining these questions there are several points which the reader should note:

1. The use of leading questions.
2. The internal statistical checks within a group.
3. The validation of the production questions by questions put to inspectors.
4. That the production questions identify the problem.
5. That the inspection questions indicate remedial measures.
6. The probable impact of the remedial measures on morale, quality, production and profits.

#### PRODUCTION QUESTIONNAIRE

*Question 12.* "Do you always know what quality of work will be passed or rejected by the inspectors?" Yes\_\_\_\_\_ No\_\_\_\_\_.

*Response:* Yes..... 62 per cent  
No..... 33  
No Answer..... 5

*Question 14.* "From day to day, do the same inspectors always require from you the same quality of work?" Yes\_\_\_\_\_ No\_\_\_\_\_.

*Response:* Yes..... 64 per cent  
No..... 29  
No Answer..... 7

*Question 15.* "Do different inspectors always require from you the same quality of work?" Yes\_\_\_\_\_ No\_\_\_\_\_.

*Response:* Yes..... 51 per cent  
No..... 32  
No Answer..... 17

The purpose of Question 12 was to determine whether production workers felt that the inspectors did their work consistently; it also sets the stage for Questions 14 and 15. Question 14 was designed to elicit information regarding the day-to-day consistency of a given inspector. Question 15 attempts to determine the belief as to variation from inspector to inspector. It would be expected, *a priori*, that the percentage of "No" responses would be greater for Question 15 than for 14, since inter-individual variation should be greater than intra-individual variation. This expectation is confirmed by the data. The difference might be a chance variation, but at least it does not arouse the concern that would have occurred if the percentages had been reversed. Despite the apparent internal consistency of these questions, the results should be checked. This was done by two questions put to the inspectors, as shown below:

#### INSPECTION QUESTIONNAIRE

*Question 13.* "Are you uncertain whether an item or tray should be passed or rejected?" Frequently\_\_\_\_\_ Occasionally\_\_\_\_\_ Never\_\_\_\_\_. If "Frequently" or "Occasionally," give an example.

*Response:* Frequently..... 8 per cent  
Occasionally..... 62  
Never..... 17  
No Answer..... 13

It will be noted that seven out of every 10 inspectors were frequently or occasionally uncertain whether they should pass an item. These figures are all the more impressive when one considers they are self-condemnatory, and when the reader learns that fairly heavy penalties were levied against inspectors when faulty material got out of the plant.

Ninety-six inspectors gave examples of reasons for which items had to be rejected, but about whose application they were uncertain. These have been classified and are presented below.

1. Inconsistent rules and standards.....	29 per cent
2. Condition of contents.....	20
3. Condition of containers.....	21
4. Condition of stamping or printing of labels.....	11
5. Condition of packing.....	9
6. Torn or crooked labels.....	10
7. Miscellaneous.....	23

The second question dealt with the actions of other inspectors.

*Question 33. "In your opinion, do other inspectors sometimes pass items you would reject?"* Yes\_\_\_\_\_ No\_\_\_\_\_ Don't know\_\_\_\_\_. If "Yes," give an example.

<i>Response:</i>	Yes.....	47 per cent
	No.....	7
	Don't Know.....	31
	No Answer.....	15

Nearly half of the inspectors believe that other inspectors employ standards different from those employed by themselves. This is a shocking finding, in view of the fact that these results were obtained in a company which prides itself, and with cause, on its unusually effective inspection system.

The sixty-five inspectors (47%) who answered "Yes" cited the following examples of differences in performance among inspectors:

	<i>N</i>
1. Torn or crooked labels.....	17
2. Condition of container or package.....	17
3. Condition of contents.....	16
4. Blurred stamping or printing of labels.....	5
5. Miscellaneous.....	10
	—
	65

It is evident that many of the inspectors are uncertain as to the rules and regulations, and that different standards exist among them. Their replies to these questions confirm the beliefs of the production workers and, thus, validate the findings of the production questionnaire.

The variations in performance cited by the inspectors provide management with a starting point for improving inspection. Management must

define standards, and the inspectors must be indoctrinated in their application. Then, three results accrue:

1. Fewer items are rejected, thus increasing production;
2. Items which should be rejected are rejected by all inspectors, thus improving the overall quality of the product;
3. A basic cause of friction between production workers and inspectors has been removed, and thus a basic cause of poor morale eliminated.

The above results stem from management's formulation of standards. The standards must then be presented to old employees by means of a refresher training course, and to new employees by rigorous, systematic training. Management must continue to "check" the system constantly. The check runs enable management to identify the workers who permit errors to get by and to study these workers to determine the cause. Some men may need new glasses; others may require a review of the rules and regulations; and for still others, some modification of the work area to fit the individual may be required. The "Check runs" and refresher training courses enable management to bring the inspectors up to an acceptable pre-determined standard. Since this system was installed in one specific company, members of supervision have stated that friction between the two groups due to misunderstandings as to whether merchandise would pass inspection or be rejected has been materially reduced.

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## Part Two: TRAINING IN INDUSTRY

### 1. Persistent Problems in Training

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*William McGehee*

Reprinted from *Current Trends in Industrial Psychology*, Pittsburgh: University of Pittsburgh Press, 1949, pages 97-114, by permission of the author and publisher. A systematic treatment of the following training problems: (1) Who is to be trained. (2) The content of training. (3) Methods used in training. (4) The training of trainers. (5) Evaluation of the outcomes of training.

There are certain persistent problems in industrial training to which complete and dependable answers can be found neither in the literature on industrial training nor in the practices now being followed in industrial concerns. Techniques and methods developed or being developed by psychologists and workers in related disciplines can be used to secure more dependable answers than are now available to these problems:

1. Who is to be trained?
2. What is to be the content of training?
3. What methods are to be used in training?
4. Who is to do the training?
5. How are the outcomes of training activities to be evaluated?

Let us consider the first problem.

**1. Who Is to Be Trained?** The obvious answer to this question is that everyone in an industrial organization from president to sweeper needs to be trained to some degree. Such an omnibus answer has certain practical limitations. These limitations involve the amount of time, money, and personnel which can be allocated to training in terms of potential gains in productive efficiency. The average industrial concern must determine accurately what training activities can be carried on in terms of maximum return for the time and money invested. This means that they must determine who among their employees are most in need of training.

Three interrelated approaches are necessary to determine who is to be trained: (1) Continuous analysis of production to spot problems; (2) Systematic, continuous audit of individuals in the work force; (3) Projection of potential labor needs into the future. This threefold analysis is more

easily visualized perhaps in a production unit such as a weave room than in other industrial units, but the same approach is applicable to determine who should be trained in clerical, technical, and executive groups of workers.

While the indices of inefficient production such as substandard quality and excessive waste may not be the province of psychological techniques, nevertheless, psychological techniques can be used to determine whether or not these evidences of productive inefficiency indicate a training need. A clear-cut example of this type of approach to the problem of machine-human responsibility for defective production is found in the study of operators of automatic knitting machines by Dunlap, reported in part in *Modern Industry* (2). Dunlap was able to demonstrate that variation in stocking length and weight could be attributed to the individual knitter's methods of turning the machine on, inspecting and marking stockings after the effects of such factors as material, differences in machines, and variations in temperature and humidity were held constant. He was further able to identify those individual operators whose work habits were inefficient and who required training to get the best possible production out of an automatic machine.

This development of biomechanics has definite possibilities for indicating those individual workers who need training in varying degrees and amounts. Unfortunately, the rather elaborate experimental design and extensive statistical treatment required in the type of research conducted by Dunlap will discourage its use in many industrial situations. There are, however, simpler techniques which may be used on less complex jobs for identifying workers requiring training. For example, a modification of the sample method of activity analysis used in the study of child behavior has been applied recently by Christensen (6) to problems of determining aircraft crew requirements. This method could be used to identify operational weaknesses of specific employees in performing their job assignments.

Other techniques now used for different purposes by psychologists can be modified and adapted to the problem of identifying individuals in the work force who need training or retraining. The development of analytical types of trade and work sample tests and their periodic application to employees would indicate whether or not these workers need specific training. Improved rating techniques oriented toward training needs can give clues as to what worker or workers require training. Questionnaires and interviews designed to help either the worker or the supervisor analyze training needs will help identify employees needing training.

Let me cite, as an example of a combined approach to identifying employees needing training, a procedure we are using in one of our larger departments. The first step is a careful analytical interview with the supervisors in the department designed to identify those workers whose production is low in quantity or quality or who have exhibited behavior on the job symptomatic of poor work attitudes. A second phase of this program is a

careful study of the production and personal records of each of these workers. The third phase will be to make direct controlled observations of the job behavior of workers identified as substandard. This approach has already had an interesting by-product. We have been able to identify certain supervisors who need specific training in the human relations aspect of their jobs.

This discussion has centered primarily around identifying personnel already employed who need training, rather than approaching the problem from the point of view of the new employee. This approach has been deliberate, since it is my opinion that except in an expanding labor situation, identification and retraining of present employees will pay greater dividends from training efforts. The problems of determining the need for new employees, planning for training, and providing for promotional training for present employees, however, cannot be overlooked. The Program Development approach introduced by Training Within Industry (3) is now being used in modified form in certain large companies for the purpose of determining training needs in the future. This method allows for an over-all picture of the present capacity and potentialities of employees in a department as well as a basis for determining the demands for new employees in terms of possible turnover as well as in terms of the production demands on the department.

Techniques are already available for determining who shall be trained. The need is for sharpening the analytical edge of these tools, modifying them so they receive acceptance by industrial personnel, and applying them economically in the industrial situation.

**2. What Is to Be the Content of Training?** As you have probably surmised, the techniques described in the preceding section will also produce data which can be used in determining the content of training. Basically, however, the first step in determining the content of training is an adequate job analysis. Job analysis in varying degrees of complexity was a standard procedure employed by psychologists in military selection or training projects. Job analysis' methods for determining training content for production workers have been described in detail by Tiffin (16) among others. Most discussions of job analysis, however, seem to overlook the fact that it is a measuring instrument and has the same requirements of any adequate instrument: reliability and validity. This is true whether the technique used is that of questionnaire-observation, motion photography, or movement analysis recently described by Lindhal (9). The reliability of a job analysis has been overlooked by the majority of users. Certainly we should know if a competent analyst gets comparable results with that of another competent analyst using questionnaire-observation techniques. Motion photography, since it is expensive and time consuming, may not secure an ample sample of the job. Further, motion photography requires a human observer for interpretation. Certainly Clifford Morgan's statement in regard to job analysis of operating

an aircraft that "Whatever the particular method used . . . care should be taken to get a long-term, unbiased sample that represents all of the activities and all the links. . . . The ultimate answer is not better than the sample of data obtained for analysis" (13) is pertinent for job analysis for industrial training. There is much needed research on the problem of reliability of job analysis.

From a job analyst standpoint, validity refers to the "completeness" with which the job is analyzed and described. All forms of job analysis mentioned above leave something to be desired in completeness in that they, as a rule, give no indication of training content useful in the modification or shaping of workers' attitudes. As indicated earlier, the practical training man in the past several years has become increasingly concerned with the attitudes of workers, particularly toward economic issues, quality of production, and other factors involved in group morale. Training material directed toward attitudes can go wide of the mark. Yet the accurate knowledge of existing attitudes frequently is not available. This means simply that opinion-attitude research methodology has a definite place in determining training needs at the rank-and-file level. In fact, present indications are that refinement and sharpening of these techniques are necessary.

The discussion to this point in regard to determining the content of training has been focused primarily on determining the content at the rank-and-file level. There is equal need for careful determination of the content at the level of supervision and management. It is a much simpler task to analyze the job of Rosie the Riveter from a training point of view than it is to analyze the job of her supervisor or the job of her supervisor's supervisor. Basically, however, the task is similar. The technique of job analysis described by Tiffin (16) can be applied with appropriate modifications to the analysis of the job of the shift supervisor, the plant manager, or the vice-president in charge of personnel. Further, the same problems of reliability and validity are found at the management level as are found in analyzing job content of rank-and-file workers.

One factor which looms large in any supervisory or executive job is that of interpersonal contacts and relations. Investigations of the frequency and effectiveness of the contacts between supervisors and other members of management and their contacts with rank-and-file workers should give valuable leads to the contents of training at this level. So far as I know, this type of analysis, which is essentially sociometric, has not been used for the purpose of determining training needs. Yet the recent effective description of human relations in the International Business Machine Corporation (14) which depends primarily on sociometric techniques suggests that they could be used effectively by training directors who are charged with planning supervisory and management training.

The problems involved in determining training content, then, involve sharpening the tools used in job analysis. They further require development and use of techniques for diagnosis of training needs of individual employees. For industry, as have the more progressive public educational agencies, must plan for individualized instruction of its personnel if it is to secure maximum returns from its training efforts.

**3. What Methods Are to Be Used in Training?** The primary problem of methods in training is that of organizing training material into optimal units and sequences, and providing proper scheduling of practice and motivation for effective learning. Ryan (15) has stated these problems and described the necessary research on them in industrial training so clearly that I could do little more than paraphrase his treatment. I do, however, wish to give three illustrations which point up some of his discussion.

The first of these centers around the problem of the sequence of training. It was customary in training loopers to have them practice initially putting hose on the points of the looping wheel while it was stationary. This practice was continued until the operator had definite competence in placing the hose. The wheel was then started. Usually there was a loss in the competence secured while working on a stationary wheel. We changed this practice by starting the wheel moving after a very short practice session on a stationary wheel. There is some evidence, which is not conclusive due to other factors which are not pertinent to describe at this point, that earlier experience with the more complex task facilitated learning. Certainly the general implications from this problem of transfer and interference are that the industrial trainer must be aware of this possibility in planning the sequence in which he presents his material to the learner.

A second illustration involves the problem of spaced versus massed practice. In the operation of spinning, perhaps the most complicated task is piecing up ends. We arranged for spaced practice on this operation and were able to reduce training time by 30 per cent.

As a third illustration let me cite one bearing on the problem of motivation. There is some evidence that understanding the reasons for performing even a simple task facilitates learning. We made use of this principle in the following manner: We were having trouble with an excessive amount of oil in the finished fabric. This could be traced primarily to the fact that dirty and oily fillings were being inserted into the looms by the battery hands. A series of group meetings were held with these employees at which not only the methods for detecting the proper sort of filling and rejecting defective filling were reviewed, but also it was indicated clearly what effect the insertion of faulty filling had upon the product and its acceptability by the consumer. A manual was prepared illustrating the effect of poor filling on the cloth. These steps reduced by 50 per cent the defects in the cloth which could be traced to this source.

Problems of methods of training rooted in the psychology of learning arise not only in training rank-and-file workers in skills or in imparting technical knowledge, but also in training supervisors and the higher echelons of management. This is particularly true in training designed to improve handling of human relations in the plant. Many of us who have planned or participated in supervisory training have usually had a sense of frustration at the failure to translate the material presented from a verbal to a functional level. Supervisors in a conference will agree that a worker should be praised in public and reprimanded in private. The same supervisors under the stress of production demands will omit praise altogether and broadcast throughout the plant the sins of an erring worker.

I believe that Hoslett (8) in his review of methods used in training supervisors in human relations has indicated the necessary prerequisite for effective supervisory-management training methods. He states, "This experimental evidence [referring here to Allport's (1) study of the psychology of participation] suggests that people must participate in a situation in some ego-involving way before substantial permanent learning occurs. The passivity or polite academic interest typical of many training sessions is not enough to change habit patterns of long standing. The whole personality must be involved in such a complete way as to make future conduct a spontaneous expression of that involvement." Hoslett in the same article from which I have quoted criticizes both the conference method, "pure" and "controlled," and the various J programs of Training Within Industry for their failure to fully enlist the participation of trainees and thus bring about the maximum change in their behavior. He then suggests that the recently developed adaptation of Moreno's role playing techniques for management training (4, 5) develops real participation and thus greater modification of behavior of those who take part in this method of learning about human relations. The proponents of role playing further claim that this method has, among other advantages, the following:

1. It is more nearly in line with accepted learning principles in that it minimizes necessity for transfer of training, furnishes immediate rewards and punishments for behavior, and keeps the participants informed as to their progress.
2. It sensitizes a supervisor to the reaction of employees through the process of identification in playing the role of the worker.
3. It provides a useful catharsis for the participant.
4. It is not only a training technique, but also a diagnostic instrument.

Role playing as a technique of supervisory training has many interesting possibilities. Yet as Hoslett (8) has indicated, it is not a cure-all for changing patterns of management behavior. Much of its efficiency depends upon the skill and finesse of the leader. Further, we know very little about the situations or conditions under which this type of training is most effective. The reports

of the use of role playing, as is true of so much of the literature on training, are usually in nonquantitative, descriptive terms. Certainly, before this technique is accepted as a panacea for supervisory training problems, it needs to be submitted to carefully controlled studies which will compare its merits with other types of supervisory training in varying situations.

This is not to decry the principle of participation as an effective method of changing attitudes and behavior. Certainly such studies as those of Bavelas (4) on group decisions in setting production goals and of Marrow and French (12) describing how an industrial stereotype was changed, as well as those cited by Lippitt (10) at this meeting in 1948, give clear-cut evidence as to the effectiveness of active participation in training employees both at the rank-and-file and at the executive level. The point which I am making is simply that role playing should not succumb to the deteriorating influence of cultism which too frequently has retarded the advancement of promising techniques, as has happened to some of the projective methods used by clinical psychologists.

A final word on methods before passing on to my next topic. Industrial training units have used widely various mechanical aids, particularly visual, for teaching employees. Just how valuable are visual aids in training industrial employees? Are they more effective in modifying attitudes than developing skills and knowledges? Frankly, I do not know. And I do not believe that many of the users of these visual aids know the answers to these questions. There are too few carefully controlled studies like those of Vander Meer which approach these problems. Vander Meer (17) found that engine lathe operators trained in part by the use of films required less time to master the operation of the lathe, acquired more factual information concerning its operation, and produced with less waste than did trainees instructed without the use of film. This study indicates clearly the approach that must be taken in determining whether visual aids and other mechanical means of instruction facilitate the training of industrial employees.

**4. Who Is to Train?** There is an increasing amount of evidence that training in an industrial situation is effective in proportion to the effort made to organize a definite training program and train instructors in presenting materials. Greenly (7) for example, showed that the average time for changing knives on flying shears was reduced from 29 minutes to 18 minutes as a result of installing a specific job training program. Maier (11) reports that the trainees' rate of learning a stitching operation is distinctly more rapid after trainers had received special instructions than it was before the special teaching methods had been introduced. In one operation in my own company we have been able to reduce the average learning time from 18 days to 6 days by developing a definite training program and instructing the trainer in techniques of administering the program and teaching the trainees. The essential problem then in regard to who is to train becomes one of selecting

from among plant personnel those individuals who have the greatest aptitude for instructing others and training them in best available techniques of teaching.

There is a danger here that the staff-training man will take over the functions of training which should be placed directly upon the supervisors. The modern foreman, with the increasing number of duties which have come his way, often abets this tendency. The staff man, however, is letting himself in for future headaches if he withdraws this duty of training from the line supervisor. One means of preventing this is to make the line supervisor a partner in planning training for his department. He should participate in all the steps of developing a specific training program from the initial job analysis on through evaluating the effectiveness of the training procedure.

The necessity of having line supervisors actively participate in the training of their subordinates is equally important and more difficult to achieve the further we go up the management hierarchy. The demands upon the time of a top executive make it very difficult for him to participate actively in training of his subordinates. Top management, however, can be convinced of the necessity of an active part in training. In one company, for example, the director of training became convinced that management machinery would move smoother if the general principles of the scientific method could be taught to the top management group for use in decision making at that level. Directors of training are rarely in a position to suggest to vice-presidents in charge of production that they need to improve their techniques in decision making. This particular training director, however, had an open-minded top management group who were willing to attempt such a program. The program as now outlined involves instructing by a combined case and clinical method a group of top management personnel in the application of scientific method to decision making. This group then will carry the results of this instruction to their immediate subordinates, and these subordinates to those who report to them, on down through the various levels of management. The effectiveness of this program will depend in a large measure on the effectiveness of the top group who initially undergo training.

**5. How to Evaluate Training.** It is a rare issue of a journal dealing with personnel which does not raise the question of evaluating some personnel activity. Training is no exception. Unfortunately, the majority of these proposals outline procedures which at the best will leave many recognized uncontrolled variables and, at the worst, will perpetuate the post hoc fallacy. One of the outstanding examples of this fallacy is found in the final report on Training Within Industry program (3) where an attempt is made to evaluate the effect the various J programs had on industrial production. Reports here claiming 10 to 50 per cent increase in production, 13 per cent reduction in absenteeism, reduction of rejects ranging from 4 to 9 per cent without any

indication of other contributing factors than T.W.I., lead to the charitable interpretation that the evaluator simply was a victim of this pernicious fallacy.

The failure to make adequate evaluation of training techniques and methods arises from two sources. First, training personnel, by and in large, are not acquainted with the exact methods of controlled research and statistical techniques. Second, and perhaps even more important, industrial executives have not been indoctrinated into the necessity of careful evaluation of training as well as other personnel activities. A new material, product, or machine can be tested usually in a laboratory without undue disruption of the flow of work. To evaluate training by controlled research often involves departing from work routines.

This is an illustration of what I mean. We recently were asked to help improve training procedures in a certain operation and took the following steps: improved initial selection of trainees; revised the training syllabus; made some slight changes in the method of operation; inserted rest pauses during the training hours; provided for progress charts; and arranged for periodic interviews between trainees, instructors, and supervisors. We have clear-cut evidence that we reduced training time, yet we do not know to which of these innovations or to what combination to attribute this improvement. Had we isolated and studied each one of these elements we would have delayed for some time the improvement in training which we were seeking. From the standpoint of management we had achieved what was necessary. However, we gained no insights for future use on similar problems as to the effectiveness of the specific steps which we took.

Management rightly is interested in results rather than the niceties of psychological research and controlled experimentation. Yet management must become aware that carefully controlled investigation of training techniques is necessary if full value is to be received from their training dollars. This statement may be extended to the entire realm of personnel and psychological services which management is now seeking; for as Ryan (15) has stated: "Industry cannot expect decisive aid from psychology until it actively maintains research programs directed toward the solution of its particular problems, not only its immediate everyday problems but also the broad fundamental questions which underlie them."

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## 2. Improving Supervision through Training

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Norman R. F. Maier

Reprinted from *Psychology of Labor-Management Relations*, 1949, pages 27-41, by permission of the author and the Industrial Relations Research Association. It is the author's thesis that the problems in human relations training are primarily problems in attitude change, and that if training methods are to accomplish this type of change they must approach the techniques of therapy rather than the techniques of disseminating information. Experimental data are presented.

**New Concepts in Supervision.** For the past five years I have been working with four large industries in an attempt to improve supervision. The program centers on what has been called democratic leadership in management.<sup>1</sup> The basic feature of democratic leadership is to shift the responsibility for decisions from the leader to the group. In making this shift, one changes the leadership from the autocratic type to the democratic type.

This change in the placement of responsibility for solutions gives rise to some questions. If, for example, a group solves problems, how is one to decide which of the solutions suggested represents the group? One method is to use a majority vote. When this is done, the group is divided into a majority and a minority and as a consequence one may develop two or more opposed sub-groups. Another method<sup>2</sup> is to attempt to obtain a hundred per cent agreement in the group. In order to accomplish a full meeting of minds, free discussion is essential and the leader develops a new leadership role. His effectiveness becomes primarily one of being able to conduct a problem-solving conference. It is this type of leadership that seems essential if the group is to remain

<sup>1</sup> A. Bavelas, "Morale and the Training of Leaders," Chapter 8 in *Civilian Morale* (edited by G. Watson, Reynal and Hitchcock, 1942). A. Bavelas, "An Analysis of a Work Situation Preliminary to Leadership Training," *Journal of Educational Sociology*, Vol. 17 (1944), pp. 426-30. L. P. Bradford and R. Lippitt, "Building a Democratic Work Group," *Personnel*, Vol. 22 (1945), pp. 2-13. N. R. F. Maier, "A Human Relations Program for Supervision," *Industrial and Labor Relations Review*, Vol. 1 (1946), pp. 443-64.

<sup>2</sup> K. Lewin, "The Dynamics of Group Action," *Educational Leadership*, Vol. 1 (1944), pp. 195-200. K. Lewin, *Resolving Social Conflicts*, Harper and Brothers, 1948. K. Lewin, R. Lippitt and R. K. White, "Patterns of Aggressive Behavior in Experimentally Created Social Climates," *Journal of Social Psychology*, Vol. 10 (1939), pp. 271-301.

unified and constructive. To achieve this effect, the leader must develop skills in sensitivity and permissiveness. At the same time, he must not permit himself to become a passive leader, but must be able to exert controls. Permissiveness and controls seem somewhat contradictory activities, and the interpretation of these becomes one of the important problems in training and an important area of investigation.

For the present, it seems clear that some of the controls are as follows:

1. Problems presented must fall within the leader's area of freedom. At each level of supervision there are problems that a supervisor may decide himself. It is these problems that he can share with the group that reports to him if the group members have interest. Thus, decisions cannot violate company practices or policies (unless the supervisor involved is at the policy-making level) nor can they violate working agreements since problems involving these factors do not ordinarily fall within the supervisor's area of freedom.<sup>3</sup> Frequently, the "how to do a job" rather than the "what job to do" is the problem that can be solved.

2. Presenting the subject for discussion in such a manner that it is a problem rather than a criticism of the group or an individual in the group. Whether or not a group becomes defensive or interested in solving a problem depends in considerable measure on the way it is presented. Just how important the manner of presentation is we do not know, but it is clear from case studies that the incidence of defensive reactions can be traced to the supervisor's statement of the problem. On one occasion the supervisor stated as his problem the fact that certain members of the group failed to close file drawers. Immediately the group requested new files which would operate more smoothly. Considering the condition of the files this appeared to be a defensive reaction.

3. Serving in the role of an expert. The supervisor frequently has much background and information which is of value in solving a problem. Instead of using this information as a way to discredit solutions and thereby gain an advantage over group members, he can give the group the benefit of his experience by presenting them with the information at his disposal.<sup>4</sup> For example, he can point out how much space the group will have in the new office location and ask them to help plan the office arrangement. If he withheld this information and the group planned an office arrangement which required too much space, he would be in the position of having to reject certain solutions. Soon his position would be one opposed to that of the group. If all relevant facts are given at the outset the problem becomes more interesting because it is more difficult.

<sup>3</sup> N. R. F. Maier, "A Human Relations Program for Supervision," *Industrial and Labor Relations Review*, Vol. 1 (1946), pp. 443-64.

<sup>4</sup> *Ibid.*

4. Reducing hostility by permitting free expression. In permitting the expression of hostile reactions one reduces frustration and encourages motivated behavior. My own research in this field indicates that frustration and motivation are opposed processes.<sup>5</sup> By reducing frustration, one reinstates problem solving behavior. Rogers'<sup>6</sup> work also supports this contention.

5. Encouraging all members to participate in the discussion. This technique causes members of a group to interact. In interacting, the members learn their areas of disagreement, they learn about group fairness, and they learn that each cannot have things his particular way. It is in free discussion that social pressure can operate. Social pressure is always present in social behavior. The leader uses social pressure for constructive purposes by seeing to it that all feel free to participate. Certain dominant individuals must become aware of their role as listeners and certain reticent individuals must learn that they owe it to the group to speak their minds. The leader can play an important part in bringing about these awarenesses.

6. Protecting the minority. The leader can do much to relieve hostility and to bring deviants back into the group by showing special consideration to minority positions. Frequently, a few persons refuse to go along with the group because they feel excluded. If the leader gives this group of individuals special attention, demonstrating a desire to have them in the group and giving their opinions the most favorable interpretation possible, they can be made to feel that they have not been excluded from the group.

7. Making the group responsible for agreeing on a solution. A group may attempt to escape the responsibility of working as a group and continue to disagree. In practice this is much more rare than is usually anticipated. When it occurs, however, the supervisor can bring this responsibility to awareness. He can point out that a new problem has arisen, which is, "How can we get together on a solution?" Since the objective is to obtain a meeting of minds, the problem cannot be settled by taking a vote and following the majority. Thus, when full agreement is the objective, the leader becomes reluctant to split the group and holds out for keeping the group intact. This makes the leader and group members more permissive. It also forces each person to realize his responsibility as a group member. Social pressure operates in a constructive manner and one hears such remarks as, "Oh, Bill, why don't you give the idea a try?" "Come on, Jim, don't be so damn selfish." In such instances the group, not the supervisor, is applying pressure.

8. Keeping the discussion on the subject. Whether or not progress is experienced in group discussion depends, to some extent, on whether or not extraneous matters are discussed. The responsibility of keeping a discussion

<sup>5</sup> N. R. F. Maier, *Frustration: The Study of Behavior without a Goal*, McGraw-Hill Co., 1949.

<sup>6</sup> C. R. Rogers, *Counseling and Psychotherapy*, Houghton Mifflin Co., 1942.

problem-centered belongs to the leader. However, this can easily lead to regimentation. Enough leeway should be permitted to avoid introducing into the discussion an atmosphere of pressure or strictness. Further, the supervisor must be careful not to judge whether something is irrelevant. He might ask the person whether his ideas are tied in with the problem; if the person feels they are not, he can ask whether the issue raised should be discussed at a future time. Thus again, a balance must be struck between a rigid and fully-controlled discussion and one that is loose and disorganized.

It is apparent that the types of control discussed above are different from those used by an autocratic leader, and yet it can be seen that they are techniques which are psychologically sound in their effectiveness.

The techniques of sensitivity and permissiveness likewise deviate from those ordinarily used by an autocratic supervisor. These may be listed as follows:

1. Sensitivity to feelings rather than to words or logic. The supervisor must be trained to realize that the reasons a man gives for being for or against something frequently are irrelevant rationalizations. A man doesn't like something and it is the dislike that is a fact that must be accepted with understanding. Often the objections to something are fears but the words expressed are criticisms. To require proof or evidence in such instances merely increases insecurity. The fact of fear must be accepted and respected. Fears can best be overcome by permitting them to be expressed and recognized for what they are.<sup>7</sup> Thus, the supervisor must react to the feeling tones and not to the words. This sensitivity to feelings must be developed through training.

2. Permissiveness must be developed. A permissive supervisor is not on the defensive; he has no "face-saving" reactions and he is primarily concerned with the way the group members feel. Basically he believes that the group members, through free discussion, can integrate their various interests better than he can. He believes that a group is more able to solve its problem than an outsider. As a consequence, the permissive supervisor becomes an active listener. The function of permissiveness in group discussions is fundamentally the same as in non-directive counseling.<sup>8</sup>

3. Reflecting the feelings expressed. As in counseling,<sup>9</sup> the technique of reflecting feelings demonstrates permissiveness; it encourages discussion and it brings feelings out in the open where they can be freely examined and explored. It is an aid to insight in that only through the explorations of ideas and feelings can new relationships be discovered. It is desirable for the supervisor to use a blackboard for this purpose. By means of writing

<sup>7</sup> *Ibid.*

<sup>8</sup> *Ibid.*

<sup>9</sup> *Ibid.*

opinions on the board he shows acceptance and permits further exploration since he now can ask, "Are there other ideas on this matter?"

Further exploration is one of the best ways of having poor ideas rejected. The supervisor must learn not to discredit poor ideas. If he puts a poor idea on the board and then requests other ideas or reactions he can get poor ideas rejected without acting as a censor or critic.

4. The use of exploratory questions. Problem solving can be enhanced in a group by the use of analytical questions. Such questions as, "How could that be done?", "Would that plan be useful under emergency conditions?", help explore issues further and bring out additional details. Care must be exercised so that the questions asked do not discredit, degrade, or indicate an objection to the idea.

5. Summarizing ideas and solutions. The value of summaries from time to time is to see to it that all members are properly understanding the issues. Summarizing also serves as a means for holding interest in that it permits progress to be experienced.

The techniques of listening and reflecting are in direct contrast to the techniques of selling employees on a solution. Frequently supervisors confuse the idea of giving up autocratic techniques with the adopting of skill in selling ideas to employees. As a consequence they employ sales techniques and believe they are using the democratic technique. Such supervisors are more difficult to train than many autocratic supervisors because the latter are not confused in their distinctions.

**Some Training Problems.** It is apparent that the training problems involved in the institution of the type of program described are very large. The supervisor must undergo a great deal of change and, as we know, a change is frequently met with resistance. At the present time, we know that the democratic technique is one of the best change techniques we have. It is, therefore, desirable to use it as a means for obtaining acceptance of the democratic concepts themselves. In this respect I disagree with Lewin <sup>10</sup> who has expressed the opinion that autocratic methods may be necessary to achieve democracy.

The change required, in this instance, is a fundamental one and actually amounts to a personality change. The supervisor must not only view employees differently, but he must also view himself and his position in a new light. The change in attitude toward employees is not as difficult to obtain as the change in attitude toward one's self or one's position. This is evidenced by the fact that one can obtain the ready acceptance of higher management for the program when they view it as a program for supervisors beneath themselves, but when the program is given for them to practice they seek ways to demonstrate that the program is not adapted to their positions. Like-

<sup>10</sup> K. Lewin, *Resolving Social Conflicts*, Harper and Bros., New York, 1948.

wise, lower levels of supervision react by wanting to know why their boss doesn't practice democratic leadership. Thus, generally, the program can be accepted as applying to others before one can see it as applying to himself. This observation leads to two basic requirements in training.

1. Higher management must practice the democratic method so that those below can experience it first hand and also to supply the motivation that higher management's support may give.

In one training unit, which included three levels of supervision, we had succeeded in motivating the first-line supervisors to try the group decision technique. These attempts were successful in that the men reacted favorably and the results were good. Some weeks later, however, interest declined and further illustrations of its use were not forthcoming. Personal interviews with first-line supervisors revealed that they, as a group, had rebelled because the men to whom they reported had failed to practice the group method with them.

2. Role-taking procedures<sup>11</sup> and discussions, using problems supplied by the group, must be used to create the experience that the method applies to the group members' problems. Such experiences can then be extended by having group decisions in which all agree to try the method the following week.

In the previous case, in which the first-line supervisors rebelled, this step was missing for the higher levels of supervision. The role-taking and group decision phases were applied to the first-line supervisors and higher levels merely gave their consent and support.

The value of role-taking and discussion as change agents for attitudes is most difficult for management to accept. Industry has been sold on visual aids and sees role-taking and discussion procedures as time consumers. Unless one experiences their value personally they are not convincing. Since higher management frequently judges the program on intellectual grounds, they are not easily convinced. Even when such individuals consent to observe these procedures, this observation is given limited time; usually just enough to arouse hostility because the observers experience a threat to their own attitudes. Hostility passes when roles are played a number of times and then one can be satisfied that a major step has been taken. However, this added time often cannot be obtained.

It has been my experience that attempts to cut the program invariably are in the reduction of role-taking and discussion time. In one industry, the abbreviation of the training time is now being corrected by a follow-up program consisting largely of role-taking and discussion procedures.

<sup>11</sup> A. Bavelas, "An Analysis of a Work Situation Preliminary to Leadership Training," *Journal of Educational Sociology*, Vol. 17 (1944), pp. 426-30. L. P. Bradford and R. Lippitt, "Building a Democratic Work Group," *Personnel*, Vol. 22 (1945), pp. 2-13.

I have indicated that attitude change, which is akin to personality change, is a basic training problem. This does not mean that the usual training problems are not also present. Some of these may be evaluated in passing.

1. It is apparent that effective training must be preceded by a need. At the present time this is not a difficult problem. If supervisors are asked on what phase of the job they feel they most need help, there is almost complete agreement that help in the area of dealing with people is most needed.

2. Knowledge about psychology is important. Such subjects as individual differences, frustration, attitudes, motivation, fatigue, and counseling are of vital interest to supervisors and can, in part, be taught by the lecture method. For this type of training, time is readily made available. These subjects have a value in encouraging an analysis of human relations problems and permit the use of the discussion method.

3. Skills must supplement this knowledge. In order to develop skills, practice on the job, interviews with trainees, and role playing are needed. When the basic attitude change is accomplished, the opportunity for developing skills is no longer difficult to obtain.

4. Certain aptitudes must be present in the trainees. However, we have not found these requirements very great. Although persons with above average intelligence absorb the knowledge content more readily than others, their attitudes are not more easily changed. We have also seen very autocratic personalities change attitudes more readily than the friendly type of paternalist. It is desirable to investigate this problem in detail since it is quite possible that the traits which make for good supervision, when a company does not train its supervisors in democratic methods, may be quite different from the traits that are essential to good democratic supervision. It seems that some men are autocratic merely because they have not given attention to human relations, but when they see these relationships as problems they develop a real interest. Thus, men with engineering training can become interested in psychological problems when scientific concepts are incorporated in the training.

**The Risk Technique in Group Discussion.** For some time now we have been using a technique which seems highly effective for reducing fears. It amounts to the non-directive counseling method applied to groups and is based on the assumption that our fears are not the opposite of our goals. Thus, the fear of a union shop does not necessarily reflect a desire for an open shop. Rather, the avoidance of the one alternative leaves the person in the open shop camp. Sometimes it is only because the union wants the union shop that suspicion is aroused. Likewise, the union may fear to lose its gains, and management's opposition to the union shop arouses fear. Analysis of the fears reveals a different problem from that shown by an analysis of the motives.

Likewise, the fear of the group decision technique is not the same as a desire for autocratic methods. Thus, the problem in training is not a matter of demonstrating that the democratic method is superior to the autocratic, but rather the problem is one of removing the fear of a change. To reduce fears, one must release expression and this is the crux of the risk technique. After a conference training group has been presented with a description of the difference between autocratic, laissez-faire, and democratic techniques by reporting the children experiments of Lewin, Lippitt, and White,<sup>12</sup> the group is asked, "What are some of the risks that management would take if supervisors practiced democratic leadership on the job?"

Each risk that is presented is recorded on the blackboard. Frequently, the risk is reworded by the discussion leader to point up the issue. This procedure is similar to the "reflecting feelings" technique in non-directive counseling. A little discussion follows to determine the amount of support and the degree of feeling that the statement written on the board represents a risk. The leader uses his office to support the reasonableness of the risk in case the rest of the group opposes it. By this method, the group soon feels free to express risks and the leader ceases to be an individual who is trying to sell them something. Group members also can recognize unreasonableness in each other.

A group of 18 to 28 usually finds 13 to 22 risks with a mean of 18. The risks include statements indicating that production will fall, quality will decline, the union will oppose the method, morale will drop, supervisors will lose prestige, the union will get control, the decisions will be selfish, planning will be inefficient, time will be wasted, etc.

At regular intervals in a 12-week program (one day per week), the list of risks is re-examined and, whenever there is unanimous agreement that a risk no longer applies, it is removed from the list. This procedure allows social pressure to operate. The group members interact with each other and the leader finds himself in the position of having to protect minority individuals who still have fears. Of importance is the fact that the risks gradually are removed. Even the discussion on individual differences, during which the democratic method is not mentioned, is followed by a reduction in the list of risks. The discussion on counseling, which occurs last, usually serves to have the last items removed. When all are not removed, it is because one or two persons still wish to retain one or two risks.

It is also of interest to observe that presenting the group with a knowledge of the controls (given at the outset) which logically overcome certain risks,

<sup>12</sup> K. Lewin, R. Lippitt and R. K. White, "Patterns of Aggressive Behavior in Experimentally Created Social Climates," *Journal of Social Psychology*, Vol. 10 (1939), pp. 271-301.

has little effect on the fears. Even the report of cases which show that the method works on the job fails to influence the risks to an appreciable degree, but a personal success with the method causes that individual's risks to decrease.

The technique of removing risks causes the group values to come to the fore so that the trainer no longer is in a position of defending the program. Rather, the support for the program comes from the group membership who soon assume the responsibility for reducing the list of risks. Frequently, it is claimed that they initially did not understand what was meant by a risk. With changed attitudes, many of the risks begin to appear ridiculous. An analysis of the risks throws added light on the problem.

We have compared the risks submitted by 10 top and intermediate management groups with those submitted by 39 groups of college students taking similar training on the campus. It was assumed that management and student personnel differed primarily in business experience. If the risks submitted are judgments supported by experience, then the risks should be different in the two groups since management personnel have had much more experience in supervisory problems than students.

This analysis revealed that (1) the number of risks, (2) the type of risks, and (3) the order in which they occurred in the list, were surprisingly similar. Only one difference, which is not statistically significant, seems worthy of mention, namely that the student groups seem somewhat more distrustful of workmen.

We conclude, from this failure to obtain a difference, that the fears are not based on business experience but are emotional objections. These objections are then rationalized to point up some undesirable consequence. Both management and student personnel can use logic, so that the risks constitute deductions of all of the things that might be different if a change is introduced. Students, however, felt their risks were incomplete and that they would be able to think of more and better ones after they had business experience. Thus, experience tended to give confidence in opinions but it did not aid in furnishing opinions.

It was also found that if risks are requested after certain controls and industrial experiences with the method are presented to a group, the content of the list of risks is not altered. However, less support is given to those risks which are answered by the added content, but this is offset by the fact that more support is given to other risks.

**The Quality of Group Decision.** Although it may be conceded that objections to the democratic type of supervision are largely attitudes based upon fears, there is one type of objection that may have a factual basis. This is the doubt that may be raised as to the quality of group decisions. There is little question but that group decision makes for better acceptance than

decisions imposed by the leader. However, high group acceptance of poor quality decisions may not always be as desirable as less acceptance and better quality.

The relative importance of acceptance and quality, of course, will vary with the type of problem. If the problem is merely one of determining who will work on Sunday, the actual solution is unimportant, but an acceptance by the group that the person chosen is a fair choice is of great importance.

On one occasion, two out of three girls were needed for Sunday work. All three had dates and none wished to work. Obviously, any solution that the supervisor would present would meet with objections. He put the problem to the girls. The discussion revealed that one girl had a date with girls and all agreed this was not a real date. She therefore agreed it was logical for her to work. Of the two remaining girls, one had a date with the man she was engaged to, while the other had a date with a new man. All of the girls agreed that an engaged girl could alter her date, so it was agreed that the girl with a new conquest had priority. She was excused from Sunday work despite the fact that she had least seniority and had worked less often on Sundays.

In other instances, the group may expect to improve the quality of decisions because they are near to the job. Thus, they know why men violate safety practices, which individuals are spoiling a job, why they stop for coffee the first thing after leaving the company garage, etc. These sources of information can be tapped to improve solutions and at the same time supply acceptance and motivation.

On one occasion a supervisor of a repair crew had a group discussion and asked the crew for ideas on how the job could be improved. The discussion revealed that the crew thought that the company procedure on difficult repairs was all wrong. The plan used was that when a repair man failed to do a satisfactory repair job, a more skilled man was sent out on the job. The men said they had no way of learning about their mistakes by this method. The group's solution was that, in case of a customer's report of a failure on a repair, the foreman should accompany the man who first visited the job, and together they should locate the difficulty. This method, the men thought, would supply added work interest in that the men would be able to follow up on their work; it would give added training; and it would prevent the foreman from passing unfair judgments on their work.

The group's solution was put into practice and within six months the number of "repeat" repairs fell to one-fourth of the original figure. Thus, a nearness to the job supplied essential information for a good solution.

However, there still remain problems whose solutions have the quality of inventiveness or elegance. Suppose the supervisor or an expert knows a better way to do the job. Must he abandon a good idea if the group cannot discover

this superior solution? Watson<sup>13</sup> and Shaw<sup>14</sup> found that group thinking is better than individual thinking, but this is true only when no outstanding creative individual is involved. What happens when the leader has an elegant solution that the group members cannot discover?

In order to test this possibility we selected an industrial problem, one solution of which had the quality of elegance.

The problem chosen was a sub-assembly job in which seven men worked on a production line. The separate operations were given as requiring like aptitudes. One man in the group, however, was a slow worker and was described as a bottleneck. Because of him, production was low. The question raised was how to increase the group's production. In the actual presentation all relevant details were supplied and the following Figure was used to describe the situation.

### "Parasol" Assembly Problem

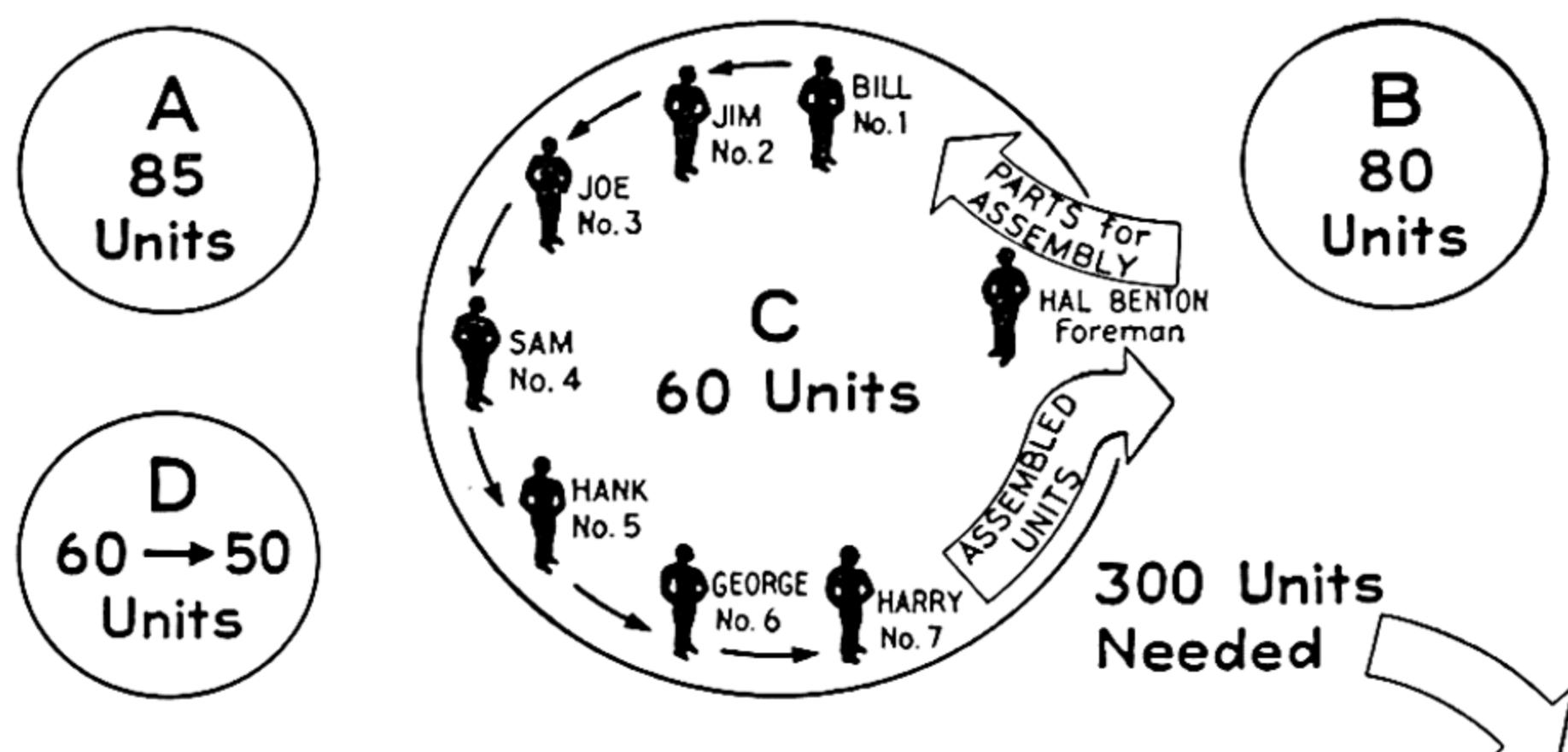


FIG. 1. Each circle represents a group of men working on a subassembly job. Seven men work in a circle and assemble a piece of equipment. The production of each group is shown in the diagram.

The foreman in group C has a problem. Work piles up in Joe's position so that production is slowed down. The company needs more production and both groups C and D are falling behind. Each group has a foreman, but the foremen do not have the authority to exchange men. How can the foreman of group C best solve his problem? The foreman of group D attempted to solve his problem and as a result his production fell from sixty to fifty units.

The solution regarded as elegant was periodically to rotate the position of the men so that the work of the slow man would be spread to all posi-

<sup>13</sup> G. R. Watson, "Do Groups Think More Efficiently than Individuals?" *Journal of Abnormal and Social Psychology*, Vol. 23 (1928) pp. 328-36.

<sup>14</sup> M. E. Shaw, "A Comparison of Individuals and Small Groups in the National Solution of Complex Problems," *American Journal of Psychology*, Vol. 44 (1932) pp. 491-502.

tions. Logically, this solution should make the pace of the line equal to that of the average of the group's ability and motivation.

Twenty small groups (of five to seven) of college students, and 40 students working as individuals, all failed to present the elegant solution as the method to use. Almost all of the solutions were directed toward removing the bottleneck. This preliminary experiment demonstrated that the elegant solution was not obvious.

Further, it was found that when the instructor presented the groups with the elegant solution it was not accepted by more than half of the persons and very few of those accepting it regarded the solution as superior to others suggested.

The problem was now changed in two basic ways: (1) Roles were assigned so that each person in a discussion group could be given a position in the production line and a definite attitude to portray. (2) A person was put in charge of the group and was asked to play the part of the foreman and to reach a decision that all of the workers would agree to. This person was specifically trained or instructed. The following experimental conditions were then used.

*Condition 1.* A total of 31 individuals was asked to work on the problem as individuals and come up with a recommendation such as an expert might evolve.

*Condition 2.* A total of 42 individuals was given the roles and each was told that these roles would give him an idea of the kind of men he had to deal with. Each person was asked to recommend a solution as in Condition 1.

*Condition 3.* A total of 29 groups of persons was given the roles to play and a person untrained in guiding group thinking was asked to be the supervisor. He was asked to hold a discussion and obtain a unanimous group decision from his workers.

*Condition 4.* A total of 17 groups was given the roles as in Condition 3, but the leader was trained in democratic leadership as well as in how (a) to influence the direction of thinking, (b) to ask questions which lead out of blind alleys, and (c) to keep the group trying out new ideas. These added instructions were based upon the author's studies on how to improve reasoning performance. He also knew the elegant solution, but was instructed never to supply it or any part of it. He was merely to stimulate the group. The writer, as well as instructors, played these leadership roles.

The results obtained from these 4 conditions are shown in Table 1, which divides the solutions presented into 7 types.

It will be seen that only in Condition 4 does the elegant solution occur with any degree of frequency (73.5 per cent). Thus far, we cannot say to what extent the leader's knowledge of the solution contributed and to what extent his skill contributed to the results. The fact remains, however, that

TABLE 1. RELATIVE FREQUENCY OF EACH TYPE OF SOLUTION

Conditions for Solving	Individual (Without Roles) Per Cent	Individual (With Roles) Per Cent	Group (Untrained Leader) Per Cent	Group (Trained Leader) Per Cent
Number of cases.....	31	42	29	17
A. Elegant solution.....	0.0	2.3	3.4	73.5
B. Give less capable less to do.....	25.8	54.8	72.4	17.7
C. Change Joe's make-up.....	4.8	0.0	0.0	0.0
D. Promote Joe to foreman.....	4.8	4.7	1.7	0.0
E. Get rid of Joe.....	50.0	9.5	3.4	0.0
F. George mentioned in solution....	0.0	17.5	3.4	0.0
G. Solutions violating stated condi- tions.....	14.5	10.7	15.5	8.8
Total.....	99.9	99.9	99.8	100.0

in the preliminary experiments the leader was unable to sell the solution to the groups.

It is also important to note that the next best solution, that of finding some way of giving the less capable workers less work to do, was progressively more often presented as we go from Condition 1 to Condition 2 to Condition 3, in which this solution was presented 25.8 per cent, 54.8 per cent and 72.4 per cent of the time, respectively. Thus, a knowledge of the roles was better than no knowledge of the roles. When actual people played these roles there was even more recognition of individual differences than when these roles were not played. The attack on Joe, the slow worker, was primarily confined to Condition 1. Joe was the bottleneck and the problem became one of removing the bottleneck. When real people were made a part of the situation by introducing roles, the inadequacy of this solution became apparent. The removal of Joe would create bad morale and become a threat to the next slowest worker.

The last two conditions in which groups were used may also be compared on the basis of the acceptance of the decision reached. Since unanimous decisions were desired we shall consider the frequency with which this condition was obtained. For this comparison we have divided the trained leaders into two groups, those led by the author, who it was supposed was most highly trained, and those led by instructors, who followed the author's instructions.

These results are shown in Table 2. This table shows that complete acceptance was obtained most frequently under the conditions which also led to

TABLE 2. ACCEPTANCE OF SOLUTION UNDER DIFFERENT LEADERS

Type of Leader	Number of Groups Listed	Per Cent Unanimous Agreement Was Obtained
Untrained.....	29	62.1
Instructed.....	11	72.7
Most highly trained.....	6	100.0

the elegant solution. Thus, the quality of the group decision did not have to be sacrificed for the sake of acceptance. As a matter of fact, acceptance and decision quality went together as leadership skill was increased.

Discussions following the solution indicated that no one suspected that the leader had a solution in mind. All groups felt that the solution was supplied by the membership.

These experiments show that a leader who has creative ideas need not sacrifice them in order to obtain acceptance. Rather, he can use his leadership skill to lead a discussion which will result in a creative solution, one that groups as well as individuals fail to achieve without this leadership. If he lacks a creative idea himself, he can still achieve acceptance and have a solution that is at least as good as one he could obtain by working alone. Thus, if his own ideas are fair and have objective excellence, he can stimulate creative thought. If, however, he attempts to take advantage of a group or impose his ideas on them, then the group will throw obstacles in his path. Supervisors so inclined are not ready for democratic supervision.

### 3. Training Operative Personnel

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C. H. Lawshe, Jr.

Reprinted from *Journal of Consulting Psychology*, 1944, 8, 154-159, by permission of the author and of the American Psychological Association, Inc. Through a systematic training program centering around the identification of needs, job analysis, selection of trainees and evaluation of the program once it is in progress, the author shows that the training of operative personnel offers a fertile area for the application of psychological techniques to the problems of industry.

In his statement of basic psychological procedures or activities in industry, Viteles<sup>1</sup> includes the "organization and systematization of training programs to insure the most complete development and most efficient use of individual

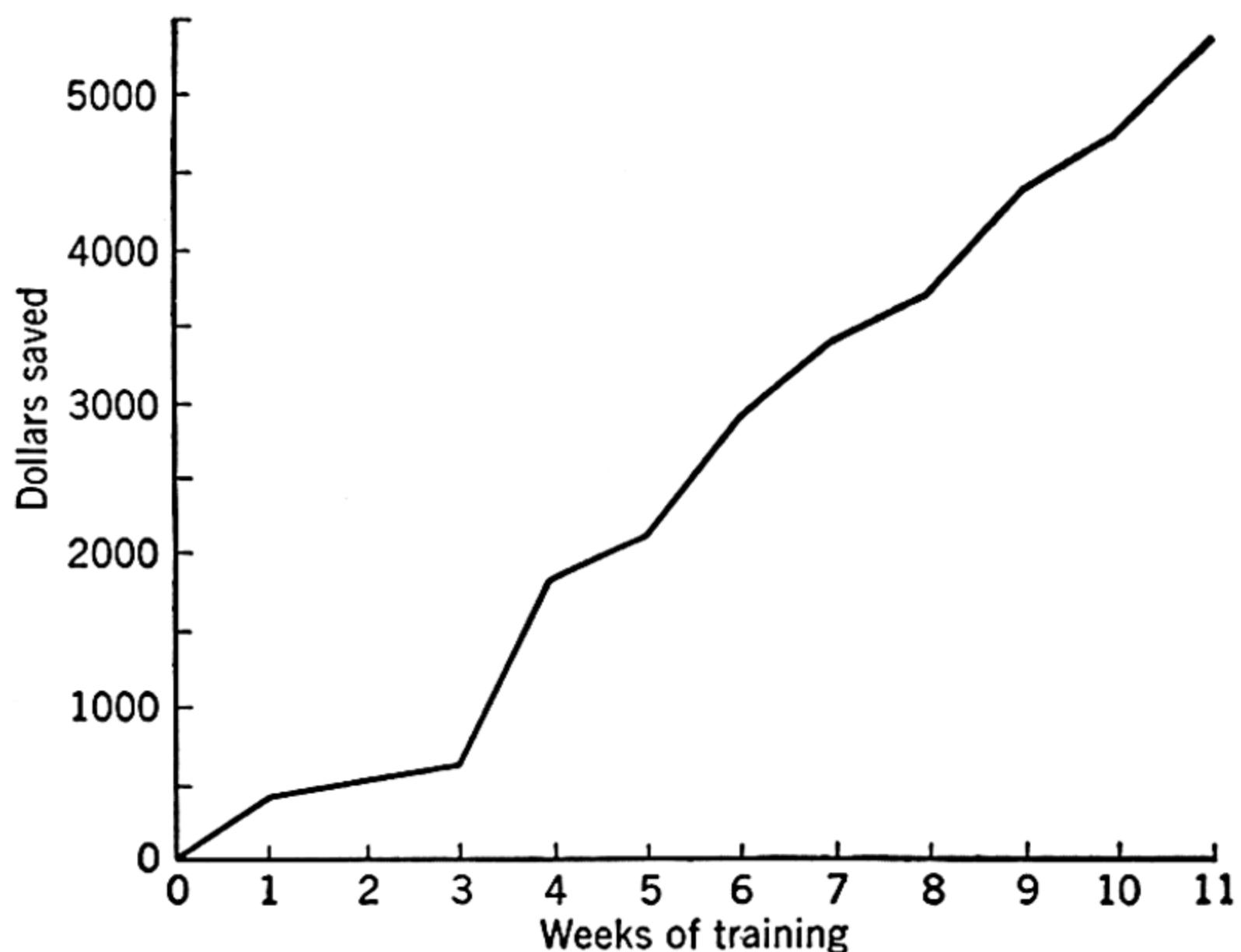


FIG. 1. The cumulative saving affected through the training of a group of hot mill rollers and crews in a steel mill.

ability." In general this organization and systematization consists of four fundamental avenues of attack: (1) the identification of training needs, (2) job analysis and the organization of content, (3) the selection of trainees,

<sup>1</sup> Morris S. Viteles. *Industrial Psychology*, 1932. New York: W. W. Norton & Co., Inc., p. 55.

(4) and the evaluation of the program, once it is in progress. The purpose of this paper is to present a sampling of approaches that have been employed in these four areas with specific reference to operator training.

Time spent in the training of operative personnel contributes to job satisfaction and to increased production. The financial worth of one operator training program to the company is illustrated in Fig. 1. A group of hot mill rollers and crews in a steel mill were given specialized training and their production performance was compared with that of all rollers and crews in the plant. The graph indicates the cumulative dollar value<sup>2</sup> of this training program for an eleven-week period, at the close of which time the total saving in increased production was \$5,300.00.

**Identifying Training Needs.** The "spotting" or identification of training needs requires an analytical approach which can be greatly facilitated by the use of a check list similar to the one shown below. This list has been useful in a number of industries and considers production, operation, cost, and personnel problems.

#### CHECK LIST FOR IDENTIFYING INDUSTRIAL TRAINING NEEDS

##### *Production*

1. Is the plant or department meeting quotas set up by the Army, Navy, or top management? ..... ( )
2. On those jobs where time standards have been established by the methods and standards department, are individual employees attaining a reasonable percentage of the standard? ..... ( )
3. Do quality control records reveal an unreasonably high percentage of rejections, wastage, or reworks? ..... ( )
4. Are there any evidences of customer dissatisfaction? ..... ( )
5. Are there any known "bottlenecks"? ..... ( )

##### *Operation*

6. Are any conversions to new products contemplated or have any been recently affected? ..... ( )
7. Have there been recent expansions in any department or are any anticipated? ( )
8. Have methods changes been made recently or are any anticipated? ..... ( )

##### *Costs*

9. Are labor costs per unit excessive for any product? ..... ( )
10. Are costs on consumable supplies excessive? ..... ( )
11. Are equipment maintenance costs excessive? ..... ( )

<sup>2</sup> The values were computed by cumulating by weekly periods the difference between the amount of change in the weekly performance of the trainees from their previous average and the amount of change of all rollers' performance from their weekly average. From Russell J. Greenly, "Job Training," *National Association of Manufacturers' Labor Relations Bulletin*, 1941, 35 (January):5-8.

## Personnel

- 12. Is the net labor turnover rate excessive? ..... ( )
- 13. Are interdepartmental transfers (other than promotions) excessive? ..... ( )
- 14. Are the accident rate or lost time from accidents excessive? ..... ( )
- 15. Are absentee rates excessive? ..... ( )
- 16. Is the rate of promotion to non-supervisory jobs high? ..... ( )
- 17. Does the labor market necessitate the use of a high selection ratio in hiring? ( )

Once points of greatest need have been located, more refined techniques are usually necessary. One plant, which was aware of the shortcomings of its employees in the use of precision measuring instruments, prepared a standardized blank form for each job classification in the inspection department. These forms in turn were handed to the supervisors of the employees holding these particular jobs with the request that the supervisors list the instruments required on each job and also the various tolerances utilized. Distributions of the use of each instrument were prepared and their relative frequency of use was established.

On the basis of this survey a "Dimensional Control Laboratory" consisting of twenty-four work stations was set up. The work space at each station contains a different measuring instrument, one standard part manufactured in the plant, and an instruction sheet indicating a single measurement to be taken on the part provided. Inspection employees are sent to the testing laboratory on the basis of a prearranged schedule. When an employee enters the laboratory, the attendant determines his particular job classification, refers to a card file to find out which instruments are required in his job, and hands the employee a work sheet for each of the stations which utilize an instrument required in his work. After he has completed these job samples, his work sheets are checked by the attendant and those revealing poor or unsatisfactory performances are filed according to training needed. When ten sheets have accumulated for any one measuring instrument, a class is organized. The program is continuous and provides for the maintenance of skills by recalling each employee approximately every three months.

**Analyzing Jobs for Teaching Content.** Job analysis of the type popularized by Training Within Industry<sup>3</sup> has had wide acceptance in industrial training programs. However, job analysis by activity<sup>4</sup> as employed by Tiffin and Rogers<sup>5</sup> in training tin-plate inspectors and as reported by English<sup>6</sup> in

<sup>3</sup> Alvin E. Dodd and James O. Rice (editors). *How to Train Workers, for War Industries*. 1942. New York: Harper & Bros., p. 9.

<sup>4</sup> Morris S. Viteles, *op. cit.*, p. 159.

<sup>5</sup> Joseph Tiffin and H. B. Rogers, "The Selection and Training of Inspectors," *Personnel*, 1943, 18, (1):3-20.

<sup>6</sup> H. B. English. "How Psychology Can Facilitate Military Training," *Journal of Applied Psychology*, 1942, 26:3-7.

training riflemen offers unlimited possibilities in the training of operative personnel. A case in point is the motion analysis technique utilized in the training of operators of disc cutting machines.<sup>7</sup> Operators of these machines cut thin discs (about .005 inch thick) from nickel-tungsten rods about  $\frac{3}{16}$  inch in diameter. The cutting action is achieved by means of a foot pedal which controls an abrasive wheel as it passes through the rod. Failure to adjust foot pressure properly results in damage to the surface of the discs, excessive wheel use, and other measurable wastage. The company has experienced considerable difficulty in the past in training new operators in that the vast majority of them did not complete the training and of those who did, learning was quite slow.

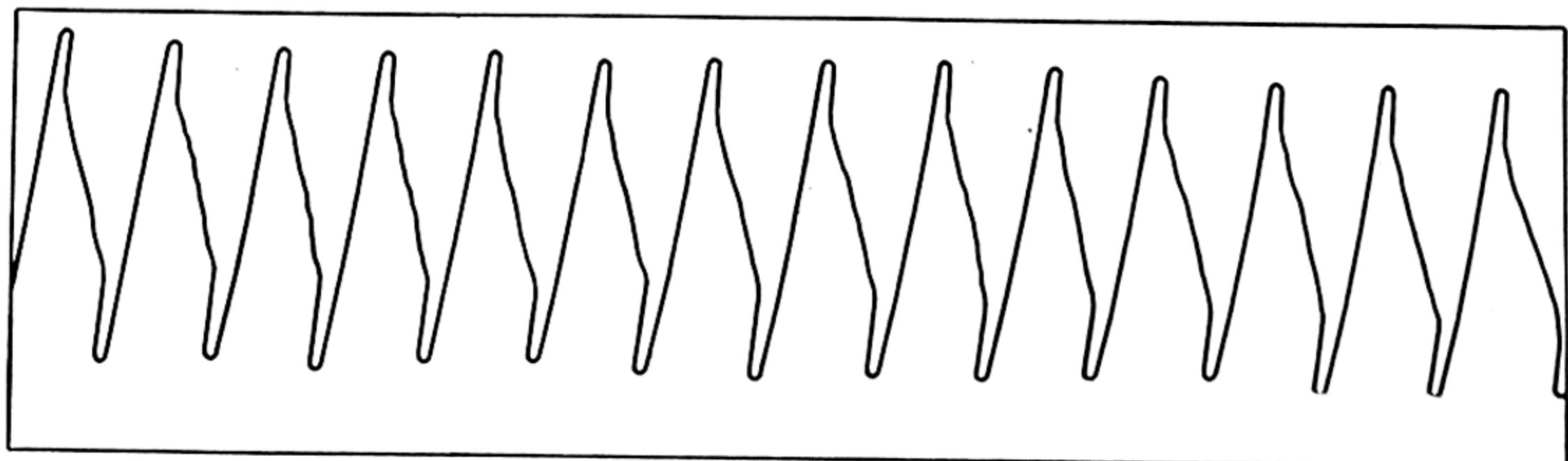


FIG. 2. Disc cutter foot-action pattern of a good, experienced operator.

The approach to this problem involved the placing of a pen and paper tape recorder so that the writing arm is actuated by a cord attached to the foot pedal. By recording the foot action of a number of operators already on the job and comparing the action patterns with quantity records, quality records, and abrasive wheel usage records, it was possible to identify the "correct" pattern. Even though each experienced operator presented a consistent pattern, there were wide variations from operator to operator. The pattern shown in Fig. 2 has been accepted as the standard pattern.

Enlarged instructional posters with analytical notations have been prepared both for "correct" and "incorrect" patterns and various types of damage to the product have been shown to be reflected in the action pattern. By careful use of the recorder at intervals with the trainee and by interpreting his foot action pattern in terms of the standard, it has been possible to reduce training time and to improve quality and quantity performance of some employees already on the job. Fig. 3 shows records of one trainee's performance at various stages of training. It will be noted that the pattern recorded after 145 hours is approaching the standard reproduced in Fig. 2. This graphic approach in assisting the trainee in "getting the feel" of the job offers many possibilities on other operations.

<sup>7</sup> The material on disc cutter operators reported in this paper has been drawn from unpublished research conducted by L. Gaylord Lindahl, Purdue University.

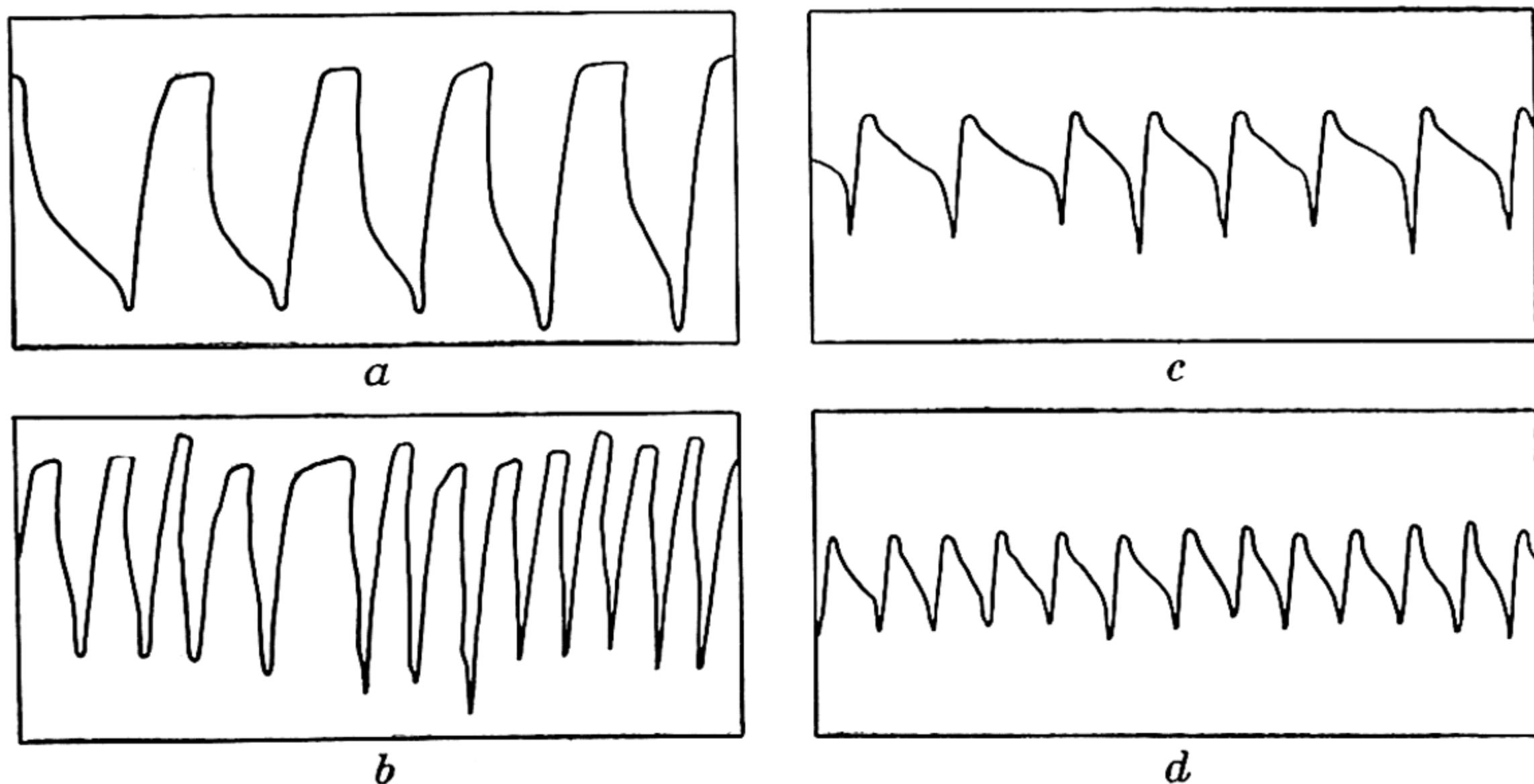


FIG. 3. Disc cutting foot-action patterns of a beginner showing improvement with training. The records were made after 9, 25, 98, and 145 hours of supervised operation.

**Selecting Trainees.** While the problem of employee testing and placement is one in itself, no intelligent approach to operator training can ignore the

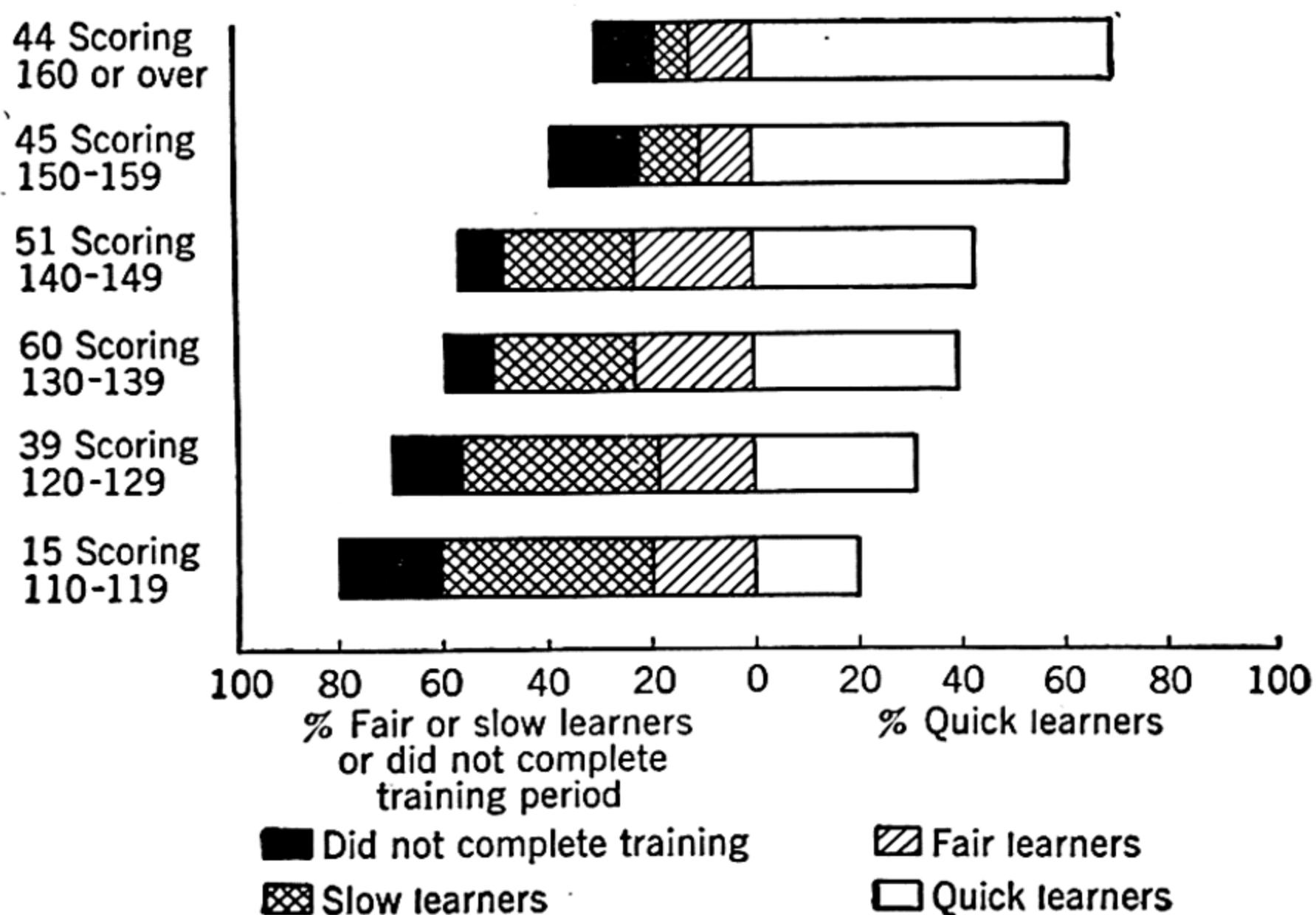


FIG. 4. Relation between composite score on two dexterity tests and speed of learning for a group of 208 coil winders.

adequate selection of personnel to be trained. Hayes' experiments<sup>8</sup> with 208 coil winders who were administered two dexterity tests is a case in point. Fig. 4 shows the relationship between the composite scores on the two tests

<sup>8</sup> Analysis of 1935-37 Experience in Selecting New Men for Shop Occupations. Privately printed monograph. Western Electric Company, Hawthorne Plant, 1939.

and speed of learning on the job. As the figure shows, the proportion of trainees who were considered quick learners progressively increased from 20 to 70 with higher dexterity scores.

Similar results have been obtained with a group of electrical trainees.<sup>9</sup> Fig. 5 shows that of those scoring in the lowest 40 per cent on the test battery, about 28 per cent performed above the average in the training program. As test scores improve, however, the percentage goes up and of those scoring in the top 20 per cent on the test battery, 97 per cent performed above the average in the training school. Both of these studies have implications for the training program, not only in terms of the performance of the trainees

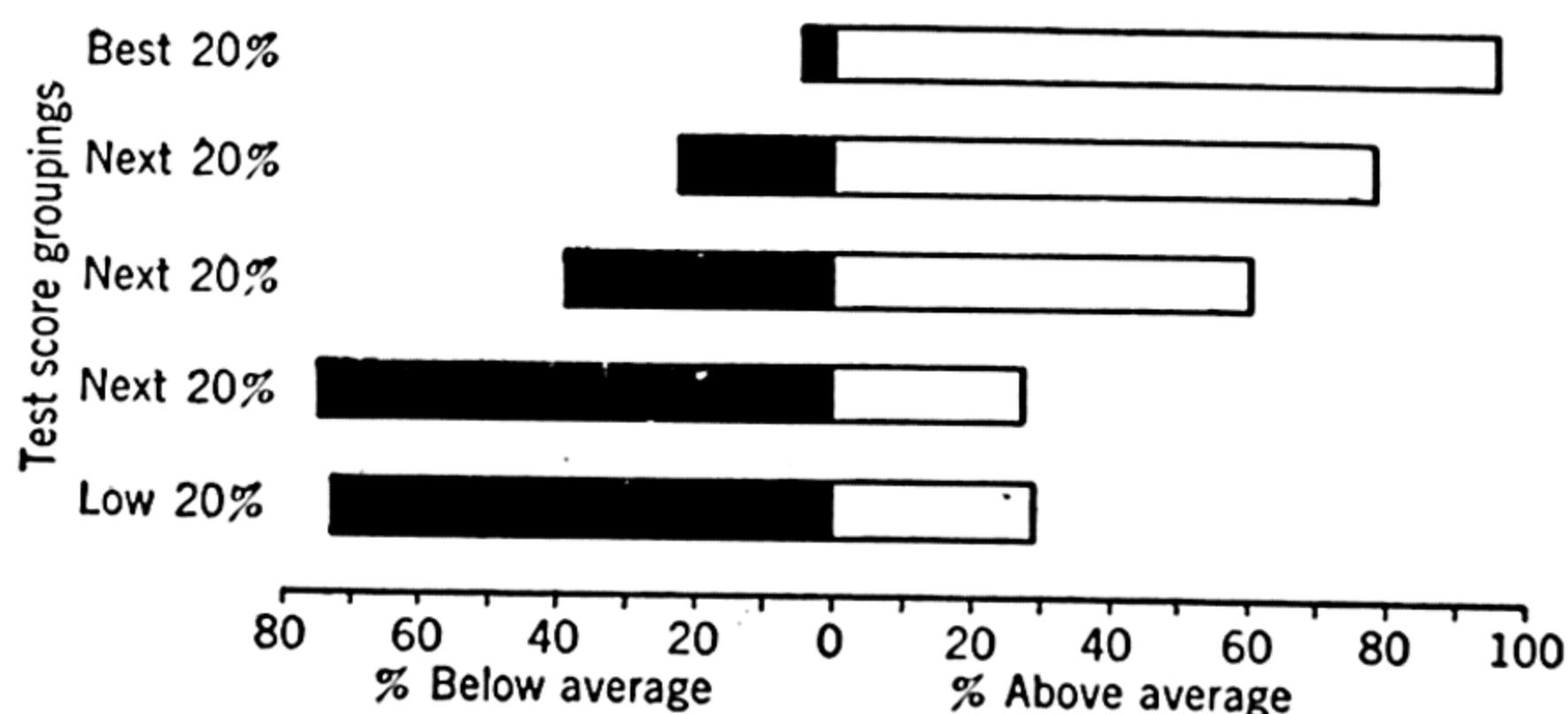


FIG. 5. Relation between scores on test battery and success in an electrical training program.

themselves but in terms of the training methods that must necessarily be employed when those persons who are less adapted to the program are admitted.

**Evaluating Training Programs.** Once the training program has been placed in operation it is frequently possible to evaluate the results by one or more types of comparisons. Below are a number of specific techniques that have been employed in comparing trained and untrained groups:

1. The number of man hours required per unit of product.
2. The amount of time required to bring new employees up to a specific quantity or quality performance level.
3. The average production per unit of time after a specified number of hours or days on the job.
4. The average production performance of employees with varying amounts of training when length of training period is not standardized.
5. The number of employees required to do a job or to produce a specified number of units.
6. The average straight-time hourly earnings when piecework or a bonus plan is in use.

<sup>9</sup> C. H. Lawshe, Jr., and G. R. Thornton, "A Test Battery for Identifying Potentially Successful Naval Electrical Trainees." *Journal of Applied Psychology*, 1943, 27(5, October):399-406.

7. The average amount of merit increase received after a specific period of time on the job.
8. The average merit rating score.
9. The average quantity or value of scrap produced.
10. The average number of "reworks."
11. The accident frequency rate.
12. The number of man hours of lost time from accidents.
13. The number of hospital visitations.

Needless to say, none of the above techniques can be employed in every instance. Prevailing conditions including the nature of the operation, adequacy

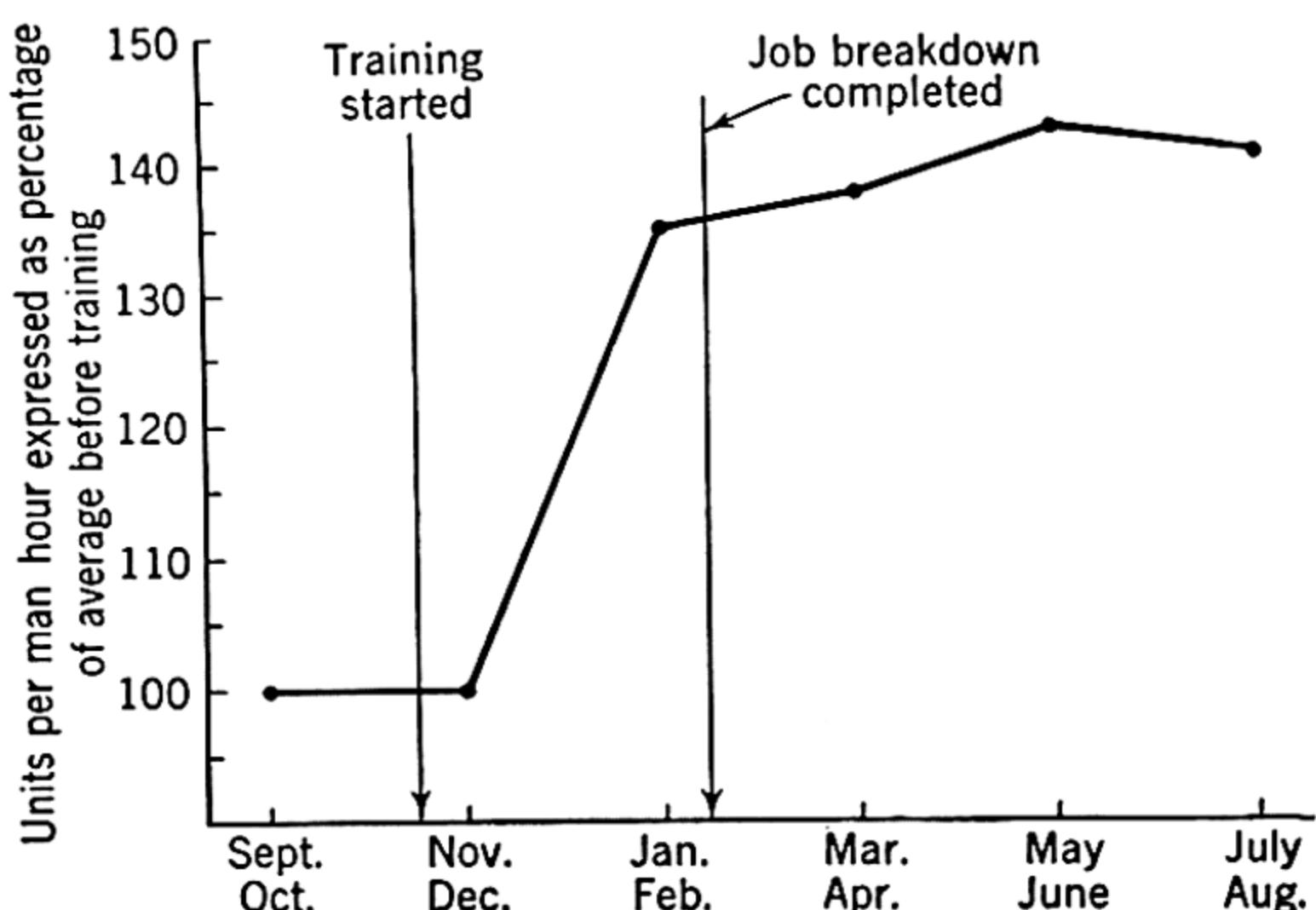


FIG. 6. The effect of a training program on the production per man hour in the manufacture of diamond wire dies.

of previous records, and number of employees involved will determine which of the above techniques can be applied. Fig. 6 illustrates the application of the first technique listed above in a plant which is engaged in the manufacture of small diamond dies which are used in the extruding of tungsten wire for use in vacuum tubes. Basically the process consists of drilling small holes through diamond chips. The number of units produced per man hour for the two bi-monthly periods of September-October and November-December, prior to the start of training, was used as the base and called 100 per cent. Following the introduction of a training program and the simplification of the job, the number of units per man hour increased approximately 40 per cent. This fact is especially significant in view of the fact that the number of employees more than doubled in the period covered by the study. Such an evaluation presents ample evidence of the worth of this training program to the company. Fig. 1, already cited, is likewise an excellent example of program evaluation. Similarly effective stories can be told when the other techniques listed above are applied to programs concerned with the training of operative personnel.

## 4. Some Problems of Industrial Training

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*Mason Haire*

Reprinted from the *Journal of Social Issues*, 1948, IV, 3, 41-46, by permission of the author and of the Society for the Psychological Study of Social Issues. In this article the problem of training is taken as a particular example of the line-staff relationship. Learning is envisaged as a reorganization of the environment, and an environment chiefly controlled by line management. This means, at once, that the line is training and that it should take the responsibility for training, leaving the staff aide a role of help and advice.

There are several points at which the relation between line and staff personnel is apt to become critical. Among these is the question of the proper role of the staff expert in an industrial training program. For many reasons the problem of training seems to have particularly fruitful potentialities for more detailed consideration. For one thing it is, with the problem of selection, one of the commonest meeting points where the psychologist as "expert" and members of industrial management come together to tackle a practical problem. For another, the problem of training should, by rights, be the psychologist's special bailiwick; in no other field can he draw on so much experimental evidence, so much theoretical development, and so much concentrated professional thought as in the problem of learning. Finally, and not the least important, tremendous quantities of time and money and effort have often been poured into industrial training programs without appropriate return. For all of these reasons, it seems worthwhile to take up the problem of training as a separate and important area of human relations in industry.

What is the typical situation when the staff expert enters the problem of training? Management will often take a position of this order:

"Things have gotten very slack around here since the war. Our discipline is slipping and production costs are way up. In a lot of places we've got five people doing the work that three used to do, and there are so many new laws and regulations about what you can and can't do that our foremen and supervisors don't know how to act. We need a good training program that will get the men back on their jobs and that will help the foremen learn how to handle them."

Does this seem to be a parody of management's position? I don't think it is. I once foolishly started a series of training sessions in an industrial setting where management's diagnosis was that "what these people need is

more human relations. You run these sessions for them on human relations, and I think they'll be a lot better off." I say "foolishly started a series" because this statement should have been enough of a diagnostic sign to warn me that this was not the time or the way to try to change human-relations skills. The training sessions went fine and everything that was learned stayed right in the Training Department's classrooms. Real progress was made in the training; every week the people came to the training sessions ready to go ahead of where they were the week before—and every week they went back to their jobs and did them in just the same way as they had for years before.

This should not at all be interpreted as an indictment of management for failing to realize the proper nature and role of training. In too many cases, the "expert" has taken the responsibility for the planning and execution of encapsulated training programs that produce change in the classroom and nowhere else. The difficulty seems to be in the heart of the problem of learning itself, and for that reason it seems worthwhile to go into that a little more deeply.

In almost no other case does the problem of learning appear so clearly to be one of the reorganization of a complex perceptual field, rather than the simple addition of little positive and negative values to certain attitudes and ways of doing things. The person to be trained is imbedded in a world in which he sees, in addition to people and things, all sorts of barriers, threats, and anxieties, goals and paths to goals. His patterning of them and his relation to them is part of the basic patterning of his adjustment to his life-situation.

If we want to make a change in some part of this pattern—to change an attitude or a bit of behavior—we make some change, however small, in this basic adjustment. Because these things are part of a whole pattern, it becomes impossible to change one or two of them without regard to the others—to add or subtract a way of doing something or to strengthen or weaken a motive. They are elaborately interdependent, and the bit of behavior we want to change by training is the way it is because of the function it serves in relation to the whole, and to change it, we must change the pattern in which it fits. We must bring about, on some scale, a reorganization of the perceptual field.

This sort of formulation of the problem of learning is essentially a restatement of the Law of Effect, except the effect is seen not as something that strengthens or weakens discrete bonds between psychological elements, but rather as a system of values, positive (goals) and negative (threats, etc.) that are part of the environment-to-be-organized.

What does this mean in the actual training situation? Let us take a specific example and look at it. Almost any standard training program for foremen will contain some such precept as "never reprimand a worker before his

fellow-workers." Let us suppose that we have a foreman in class who is notorious for doing just that. The staff training man explains in great detail, and with sweet reasonableness, why this is wrong and gives examples to prove it. Our foreman may give responses that show that he has learned the precept. If we give the group case histories involving this principle, he may be the first to diagnose the difficulty and criticize the foreman in the story for reprimanding a worker before his fellows. But, he may, also, quite possibly go back to his job and do exactly as he did before.

There is no question that the foreman has learned something. His ability to respond appropriately by producing the principle demonstrates that. Unfortunately, however, what he has learned is not very useful. At the worst he has learned that when you are in the classroom you say such and such things. However, though this is probably never explicit in his mind, it has no necessary connection with any other part of life.

We have given him two situations in which he must learn something. In the first place he has a job. He is known by his men as a tough crabby boss, but pretty fair in most ways. His supervisor sees him as a foreman who won't let anyone get away with a thing and who keeps the men up to the mark. In this situation he has prospered and been successful, and his ways of behavior are such that they fit his role in the total picture.

In addition, he has been told to attend a series of meetings. The company clearly wants him to do it. The trainer stands up in front, and, by and large, he sets the values in the training session. The way to fit into this situation is to listen to him and, in the classroom, to think in his terms. Here, too, our foreman is successful. He gets the trainer's point: if a man is late, don't bawl him out when he has just come in and is talking to the work-gang. Wait until you can take him aside and speak to him alone. But, if our foreman did that on the job, his supervisor would say, "Jim must be slipping—I never saw anyone get away with that before," and the men would begin to feel that a fellow could get away with anything now.

Our training often follows this course. Instead of producing a reorganization of the field of the real situation, we often set up another less real, encapsulated situation that never makes contact with the one that pays off in practice. In industrial training, we often drill employees until within the classroom, they can repeat the precept "never take credit for a subordinate's ideas." But we seldom do the additional job of making certain that just the opposite behavior pattern will not lead to need-satisfaction on the job. And we may be sure that, no matter what the training department says, if the plant situation is such that collecting credit for suggestions is a path to approval, then this is the organization of the environment that is really learned.<sup>1</sup>

<sup>1</sup> This peculiarity is not at all confined to industrial training. It has become a cliché to say to a young graduate, "Well, that's the way they teach you in col-

The purpose of training is to produce a change in behavior. Existing behavior patterns are part of, and are moulded by the culture of the work-group as a whole. It is exceedingly difficult to produce in an individual a behavior-change that violates the culture in which his behavior is imbedded. Unfortunately, the members of the Personnel Department's Training Staff only control the culture in the very limited area of their training classrooms.

A group of important implications pop up immediately when we phrase the problem in terms of making a change in the existing work-culture-pattern:

1. Since the plant-wide culture is determined, in most of its broad values, by line personnel, and since it is very hard to produce a behavior-change that will violate the culture, line management must do the training or have a remarkably close liaison with the training staff. The former is probably the more practical alternative.

2. Not only are the cultural values mainly determined by line personnel, but the work-group's own immediate superior is the most effective and most immediate controller of values. Consequently, again, the immediate superior is either the proper person to do the training or else he must maintain a remarkably close liaison with the trainer. Again, the former is probably the simpler alternative.

3. A third implication is that the culture of the work-situation is a thing that is being made and remade, established and supported all day every day by all the acts and attitudes and omissions of line management. For each man, his environment is constantly taking new shapes and patterns as he sees his superior's stands on certain subjects and as his relation to them changes. His reorganizations of his picture of this environment and his realization that certain ways of acting lead to success and security in this environment, are what we call learning. Line management is doing the training whether it wants to or not, and it is doing it all day every day.

In many cases we try to forget this responsibility, and to hope that we can undo an existing bad situation by devoting a weekly half-hour training session to a statement of what would be a better one. This seems to be pure escapism. To test this, think of the many plants that profess an "open door"

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lege, but the way it's really done on the job is . . ." This widespread stereotype holds one of the clearest expressions of the encapsulation of classroom instruction, and a very clear example of the case where two learning situations are presented: in one the student learns what verbal behavior will win success and security in the classroom, and in the other he learns what behavior will lead to success and security in practice. If this separation of two kinds of learning is important in industrial training, it seems to be at least an equally pressing problem for academic institutions. It is perhaps not even pressing the point too far to wonder if our moral education may not tend toward the same sort of isolation of academic precepts from "real life" behavior. Are we sufficiently careful that the life-situation is organized so that "honesty is the best policy" and "love thy neighbor" can be touchstones for action, as well as Sunday-school memory-drill?

policy in employee's handbooks, orientation lectures, and annual get-togethers. But, in these same plants, let one of the employees walk through the big boss's open door. In how many of them would he "learn" by the secretary's startled amazement and the look of annoyance at interruption, what the policy really is? All of these little things—the way the foreman says "hello," the manner in which a suggestion is received, the responsibility given a subordinate, the approbation given to a fast deal—are things that do the consistent day-to-day training.

These conclusions seem to add up to a discouraging total for industrial training. Line management should do training since they control the culture and only they can prevent classroom-encapsulation. Training for a given group should be done by the group's immediate superiors, since they control the culture most immediately. Line management is training all day every day by shaping the work-environment.

Let us add another difficulty. Training should not be introduced into the middle of the hierarchy of management since an important change at that level without preparation above it leads to an explosive situation. We are now backed into a corner where only the president of the company can start the training. He trains his immediate subordinates and they theirs, and so on down.

This situation seems, at first glance, to be patently ridiculous, and yet it is one which many managers will recognize clearly. In every contact with subordinates, the superior—from the top down—sets policy by the spirit and atmosphere of the contact as well as by the philosophy implicit in the decision. Unless formal training is closely integrated with this informal training, it cannot succeed. Thus, the training specialist, called in as an "expert," faces a dilemma. He can do "classroom" training, with its exceptional lack of far-reaching effects, or he can weigh the extreme likelihood that his proposal will be rejected if he suggests that training should begin with and eventually be conducted by the group that called him in.

This seems to be the crux of the line-staff problem with respect to training. If he chooses the former course, he seems doomed to failure, or at best an infinitesimal amount of success. He must usurp part of the function that falls naturally to line management, and try to produce changes without any but a few of the tools and powers to make these changes. Clearly, the other alternative is better for both the organization and the training specialist. If he chooses the staff role of assisting and advising line function what can he do?

The staff expert can utilize his technical skills to help line personnel frame the training problem and make its dimensions explicit, anticipate difficulties in the training process, help the line management become aware of his training techniques, and teach him new skills and devices which he can use in training. He can help plan meetings and contacts, try them out in practice

sessions, attend the meetings and evaluate the results with the leader. He can work with the line man in implementing objectives with a schedule of steps for accomplishment, but, by and large, he cannot take the responsibility for effecting their accomplishment.<sup>2</sup>

In the interests of a practical working procedure, he can probably sacrifice the ideal situation of beginning his training with the president, and begin at some convenient point lower in the hierarchy. But as he does so, he should take great pains to keep the part of the hierarchy above his starting point aware of and involved in the objectives of the training program, its pace, and concrete changes that may turn up as a result of it.

The staff expert is by no means left out of the problem of training. One of his important functions is to help line men by providing techniques that will make effective training. Foreman training offers many opportunities for this sort of guidance. One of the most difficult problems in supervisory training is to help the trainee across the "action barrier"—i.e. to help him take his learning from the verbal intellectual level to the level of practice. It clearly does no good for a man to learn the phrase "be tactful" if he has only the phrase and cannot implement it with action in appropriate situations. At this point the training expert can be of great help, and it is at this point that many of the advances in the use of role playing in industrial training<sup>3</sup> have been made.

Role playing will also be a useful device for the staff man in diagnostic sessions, where a group of line personnel is looking for the source of a difficulty, or for situations where a policy needs to be pre-tested in practice at a

<sup>2</sup> Throughout this discussion, I have kept the training problem under consideration at the rather difficult level of training in human relations, foremanship and the like. The question immediately arises: even if all this is true of these complex problems, can't the training staff teach the routine, simple things directly? Let us take a single example. In routine induction orientation, the training department instructs the new worker about the hours to report to work and so forth. There is no leeway. He must be there eight o'clock sharp. But, when he has learned this, he goes to the job. Perhaps the foreman feels that anyone who gets in by 8:05 is justifiably spending his time getting tools and what not. The employee has to learn again (and this time for keeps) how late is late, because only the foreman's view of this question has real meaning now. We are again pinched at the point where the staff man tries to take over an area that must properly belong to the line. There is no question but what, in the interests of efficiency, some such training functions have been successfully delegated to people in pure staff positions, but in many cases even such routine things as induction orientation have become a meaningless period to be passed through before an employee "really learns" about his job. Completely formalized matters, such as company benefits, automatic increases, the location of the infirmary, and the like, seem perfectly safe for staff treatment.

<sup>3</sup> Bavelas, A. "Role Playing and Management Training," *Sociometry*, June, 1947.

level of reality somewhat removed from the actual situation. In these sessions, and in evaluation-sessions after meetings, the staff man will have a large role in helping his line colleague; here, perhaps he can do real training. The staff trainer's role is by no means a passive one nor an inactive one. He has plenty to do. But, he must tread a careful path to avoid encroaching on the line's bailiwick.

## 5. Changing a Stereotype in Industry

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*A. J. Marrow  
J. R. P. French, Jr.*

Reprinted from the *Journal of Social Issues*, 1945, I, 3, 33-37, by permission of the authors and of the Society for the Psychological Study of Social Issues. An account of how the combined viewpoints of practical factory management and psychological research were brought to bear on a re-education project involving stereotypes in industry. The insights gained from the study throw considerable light upon the general problem of industrial training procedure.

In industry, each member of the management group, whether executive or first-line supervisor, is trained to be fact-minded—to base decisions on factual evidence objectively appraised. Actually his judgments frequently derive not from facts but from attitudes of which he may be wholly unaware. Stereotypes such as "Only men who look you in the eye are honest" or "All negroes are lazy" are examples of these emotionally toned reactions. Such biased judgments in industry, whether in the employment office or at the management level, create problems for both company and worker. They may be, for instance, the basis on which some otherwise qualified persons are rejected for employment. Usually these fixed beliefs are held on the unconscious level, and it is this hidden aspect of the stereotype which makes it the more difficult to change.

In most of the mass-production industries, it has been accepted that for skilled jobs older women workers are inferior to younger ones. As a result, many large companies consistently refuse to employ women over 30. This policy remained unquestioned until the growing labor scarcity, caused by wartime expansion, became acute. In the particular garment factory here under discussion, this tightening of the labor supply forced a reconsideration of the policy affecting the hiring of older women. To modify the policy, however, proved to be no simple matter.

The impulse for change originated when a psychologist joined the staff.

From a general acquaintance with psychological findings about the relation between age and ability, he did not think that a great decrement in learning ability in women over 30 years of age was likely to exist. He therefore advocated a change in policy, but opposition to such a change evidenced itself in all quarters from the top management of the organization down to the lowest levels of supervision. Until a series of re-education steps was taken which introduced the new idea directly, no headway could be made in altering the group stereotype.

**Re-education of the Top Management Group.** The first step had to be taken with the top management group. A method had to be found for changing their rigid ideology concerning age, for it soon became evident to the plant psychologist that every argument cited in favor of hiring women over 30 met with a stiff counter-argument. Older workers, it was said, never attained adequate speed in production. They were frequently absent. They had a shorter working life. They were almost impossible to teach. When high production figures for workers who had exceeded the 30-year age limit in the company's employ were brought to the attention of management, they were looked on as exceptions. The high figures were attributed to years of experience.

As arguments proved futile, the plant psychologist turned to a different approach—involve-ment of the top management group in research. A modest research project was suggested to determine how much money the company was losing through the employment of older women, and management's co-operation in this project was sought. This suggestion was promptly accepted. The next step was to get management's criteria for the value of a worker to the company. These criteria included all the factors advanced in the previous arguments, namely, rate of production, rate of turnover, absenteeism, and speed of learning. The group was fully questioned to make certain that no important criteria were omitted. Now it was possible to gather data; and here again all the methods of collecting facts about these criteria came from the management. The members of top management were the ones to decide whether the daily production record or the payroll record provided a better measure of production speed. They were the ones to suggest that analysis be made of all stitching operators in the factory. By now this group was thoroughly involved in the project, and its interest showed itself in daily inquiries.

The scene was set for the actual study—a comparison of the company's 700 employees on four essential criteria: production per man-hours, speed of learning a new skill, days lost in illness, and rate of turnover. In order to compare the various age groups, workers were subdivided as follows: 16 to 20; 21 to 25; 26 to 30; 31 to 35; and those above 35 years of age.

Man-hour production per day was tabulated. Analysis of this data revealed the surprising fact that older women not only equaled but surpassed the

younger women in production. Using 100 per cent as the standard production for skilled workers, the average production level of workers above 30 was 112 per cent (the level of the 31 to 35 group was 111 per cent; those over 35, 113 per cent); whereas the 16 to 20 group was found to be 95 per cent of standard; 21 to 25 group, 93 per cent. Analysis of speed in acquiring specialized skills showed a similar trend. The older workers were able to learn new skills slightly more rapidly.<sup>1</sup> They also showed a slightly better attendance record. Their superiority was even more striking in the annual rate of turnover. Thus, in all four criteria which the management itself had specified as essential, the findings showed that women workers over 30 are as good as—if not better than—younger ones. Even more interesting than the figures themselves was the reaction to this experiment of the top management group. They were both excited and pleased at having participated in this important discovery which had become their own. They wanted the findings published so that other war industries could profit by them. What is more, they moved to have the employment agencies notified of a change in the company's hiring policy. From now on women over 30 were to be given the same opportunity as younger women. Finally, the position of the psychologist had changed; management was now willing to leave to his judgment determination of the top age limit. The battle, however, was only half won. The task still remained not only of informing but—as it turned out—of convincing all supervisory employees in the plant. As yet, practically the entire staff remained rigidly set against the employment of older women. A method of group re-education had to be worked out for them.

**A Forelady Is Exposed to the Facts.** Before the findings were discussed with the staff, reaction was sampled. For this purpose one of the most representative foreladies was selected. In the course of a general discussion of production problems, she was asked how one of the older workers in her unit was getting along. The reply came that this woman was one of the mainstays of her assembly line. Similar inquiries about each of the eight older workers in her department of 70 elicited similar comments.

When it had become established that all the older workers in this unit were highly satisfactory, the forelady was told that the employment office had a number of applicants over 30 who might fill existing gaps in her unit.

<sup>1</sup> In regard to velocity of learning, it was found that after 96 hours of training the younger groups had reached the level of about 40 per cent, whereas the groups above 30 years of age reached 50 per cent of standard. Comparing the attendance, we found an average absenteeism of 7.62 per cent for the 30-35 group and 8.35 per cent for the group over 35, as compared with 13.36 per cent for the 16-20 age group and 9.51 per cent in the 21-25 group. The percentage of annual turnover for the 30-35 age group was 29.3 per cent, and for the groups of 36 and above, 18.9 per cent. Percentages for the 16-20 age group were 64.2 per cent, and for the 21-25 age group, 37 per cent.

She was shocked at this suggestion and rejected it on the ground that older people are not strong enough to stand the pace. At this point she was shown the findings of the research project, and it was pointed out to her that they tallied with her own satisfactory experience with older women workers. The forelady did not challenge these figures, but immediately countered with various objections—for instance, that older people learned more slowly, were absent more frequently, quit the job after a short tenure. All evidence left her adamant.

It is obvious that the forelady's individual experience failed to offer any challenge to her stereotype. She could express great satisfaction with individuals in her department who were 30 years old without relinquishing her fixed belief that older women were inadequate as workers. She had no insight into the inconsistency of her position. Apparently she could be unprejudiced in a discussion of specific individuals, but when a generalization was made, the preconceived notion asserted itself and rejection followed automatically.

From the vigor of this sample reaction it was apparent that the supervisory employees could not be convinced individually and that re-education would be necessary throughout the plant. Therefore the findings were presented to groups of sub-leaders. Discussions followed, centering around the origin of the stereotype and the possible motivations for believing in it. In the course of these meetings, insights into the original bias gradually developed. What is more, group decisions were reached recommending that an experiment be made in the training of older workers. In this way the idea of hiring older women workers was gradually established. Only with this group shift in attitude did the new policy become a reality.

**The Dynamics of Change.** The ideology at the plant had changed, and the reasons for this change became more apparent a year later when a new engineer joined the staff. He soon manifested the same old stereotype. As he put it, production was hindered by "too many old women around the plant." The plant superintendent explained to him how the value of older workers had been proved. But the new engineer remained as unconvinced by the facts and figures as the others had been initially by mere theories and arguments until the time they had become involved as a group.

And why did group involvement and decision succeed in overcoming resistance where other methods failed? Apparently it is the manner in which the experience is introduced which seems to be the decisive factor in producing a change in attitude. The stereotype withstands prestige suggestions by an experienced psychologist, by the personnel manager, by the plant manager, by the president of the company, and by a combination of these. It is impervious to all facts, be they specific examples drawn from the individual's own experience, or general arguments and theories, or the results of scientific research. It should be noted that the resistance to change existed despite the fact that all individuals concerned urgently needed more workers.

Facts are useful only when the stereotype bearer himself is reoriented in his search for a new solution.

Our experiment at the Harwood Manufacturing Corporation demonstrated that, whereas arguments and persuasion had failed to uproot a strong institutional stereotype crystallized into company policy, participation of management in research and participation of supervisors in group discussion and decision succeeded. True, through a process of guided experiences which are equally his own, a person may be reoriented so that he gradually takes on within himself the attitudes he would not accept from others.

## Part Three: ANALYSIS AND EVALUATION OF JOB PERFORMANCE

### 1. Critical Requirements: A New Approach to Employee Evaluation

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*John C. Flanagan*

Reprinted from *Personnel Psychology*, 1949, 2, 419-425, by permission of the author and of Personnel Psychology, Inc. The author describes a new procedure for determining the critical requirements of a job through direct observation by participants in or supervisors of the job. The technique integrates the problems of job definition, selection, and classification, and the development of criterion measures and makes it possible to carry out research on the criterion problem on a sound and rational basis. Determination of critical requirements is held to be the principal objective of job analysis procedures.

Experience during the past few years has brought psychologists to a realization of the central role of measures of performance for personnel administration as well as personnel research. Unless a satisfactory criterion measure is available research has been found to be not only worthless but in many instances definitely misleading. Personnel actions without adequate personnel evaluations are little better than sheer guesswork.

This situation has led to an intensive study of the fundamental nature of validity and criterion measures. Inevitably this study has in turn forced investigators to a more careful examination of the definition of the specific activity on which research is being done. Psychologists now see that without a definite and detailed definition of an activity or job in terms of actual behavior and the results of this behavior, the establishment of a criterion measure or personnel evaluation system is entirely out of the question. Thus it becomes necessary to make an intensive analysis of the behavior of workers doing a job. The usual techniques for job analysis were designed for a different purpose. They could not be expected to carry this responsibility. They provided hunches, opinions, and general descriptive materials. In practice, the research worker found that taking such findings too seriously was likely to lead to serious error and job analysis results came to be regarded as a necessary preliminary step to be followed by systematic and thorough studies

covering a very wide variety of materials. In its extreme form this latter procedure was known as the "shot-gun" approach. With a wide enough scatter it was hoped that a few hits would be scored.

A new approach has been developed which is designed to place a much heavier emphasis on the study of the behavior of the worker on the job. It aims to collect representative samples of observed behavior which can be used as a basis for obtaining objective, quantitative data regarding the job. It is hoped that instead of opinions and hunches, activity analysis can be made to yield the type of sampling data which can lead to inferences and predictions of testable reliability and validity.

The essence of this new procedure is to establish the critical requirements of a job or activity through direct observations by participants in or supervisors of the job or activity. A critical requirement is defined as a requirement which is crucial in the sense that it has been responsible for outstandingly effective or definitely unsatisfactory performance of an important part of the job or activity in question. Thus a critical requirement differs from the requirements which appear important but in practice have no important effect on performance with respect to the specified activity. Observation of personnel engaged in a specific activity leads directly to critical requirements in terms of what workers actually do on the job. In addition to such critical requirements in terms of behavior, it is desirable to determine critical requirements of the work in terms of aptitude, training, information, attitudes, habits, skills, and abilities. Critical requirements of these latter types must be based on inferences and hypotheses. These inferences and hypotheses may be checked by empirical studies.

It is believed that the determination of critical requirements in terms of behavior is a necessary condition to an adequate definition of the job in terms of behavior. Such a definition of the job must include the identification of the aspects of behavior to be included, standards of satisfactory performance for these, and estimates of their relative importance. It is also clear that a definition of the job in terms of objectively described and evaluated behaviors of this type provides an almost complete statement of an adequate criterion measure of effectiveness on the job. Similarly, no criterion or evaluation system which ignores these definitions of standards and of relative importance can be satisfactory. Thus it follows that the problems of job definition, job requirements, and criteria of success necessarily reduce to one and the same problem, at least with respect to their major outlines.

It should be emphasized at this point that observations of the behavior of the individual, or of the effectiveness of this behavior in accomplishing the desired results in a satisfactory manner, constitute not just one source of data but the only source of primary data regarding the critical requirements of the job in terms of behavior. Neither outstanding ability nor unsatisfactory ability can exist independently of a series of observed behaviors. Success and

failure in the activity are nothing more nor less than a series of actions leading to observed results.

Granting that objective data are greatly to be preferred to opinion, the next problem is how can satisfactory data be obtained. Experience in establishing critical requirements indicates that five specific conditions must be satisfied. These are as follows:

1. It is essential that actual observations be made of the on-the-job activity and the product of such activity.

2. The aims and objectives of the activity must be known to the observer. Unless this condition is fulfilled it will be impossible for the observer or judge to identify success or failure. For example, a foreman might be rated as very successful if the objective of his activity were taken as getting along well with the workmen under him. At the same time he might be rated as very unsatisfactory if the objective is to produce materials.

3. The basis for the specific judgments to be made by the observer must be clearly defined. The data can be objective only if all observers are following the same rules. All observers must have the same criteria for judging satisfactoriness. The definition must clearly state whether or not a minor imperfection will be regarded as an evidence of failure or whether a product must be completely unusable to be classified as unsatisfactory.

4. The observer must be qualified to make judgments regarding the activity observed. Typically the supervisor on the job is in a much better position to make judgments as to whether or not behavior is outstanding or unsatisfactory, than is the job analyst or psychologist. On the other hand the supervisor on the job is ordinarily quite lacking in the training essential to make an inference as to the particular mental trait which caused the behavior to be successful or unsuccessful.

5. The last necessary condition is that the situation be such that reporting is accurate. The principal problems here are those of memory and communication. It is also important that the observer's attention be directed to the essential aspects of the behavior being observed.

In order that the critical requirements accurately reflect the data collected, the process of reducing several thousand specific observations of behavior to a fairly small number of critical requirements must be competently done. The synthesis of the critical requirements from a variety of specific behaviors must be such that judges will agree that each of the specific behaviors should be classified under the summary statement which has been developed to include it. For maximum usefulness the critical requirements also should be structured in such a way that they provide a coherent picture of the activity.

In conclusion, a few of the devices which have been found effective in establishing critical requirements will be listed.

1. The critical incident technique which consists in getting incidents of extreme behavior, either outstanding or unsatisfactory, has been found very effective in collecting data where adequate records regarding behavior data are not available.

This procedure has considerable efficiency because of the use of only the extremes of behavior. It is well known that extremes can be more accurately identified than behavior which is more nearly average in character. It must be verified that the five conditions noted above are satisfied so that there will be no biasing of the sample of incidents, due either to selective memory or to inadequate definition of the type of incident to be included.

2. A second device which has been found very helpful is the evaluation and classification of incidents at the time of observation. It is much simpler to evaluate a sample of behavior at the time it is observed, when all relevant details may be noted or checked, than it is at some later time when further examination of the behavior is impossible. If an incident is evaluated and classified at the time of its occurrence and a mental note made that it is to be recorded later, the recall and recording of this material is greatly improved in accuracy and the time necessary is considerably reduced.

3. Another device which has been found to save much time is the preparation of a complete observational record form which contains practically all of the types of incidents which are likely to be observed. Incidents may be reported on such a form by merely tallying in the appropriate space.

4. A final use of such data is the direct conversion of frequencies into statistical estimates for purposes of prediction and evaluation. In situations where the observations can be accurately classified and where also an adequate representative sample of behavior can be obtained it is possible to obtain fairly accurate, unbiased estimates of the importance of a particular critical requirement with relation to the other requirements. Where the requirements are independent this can be converted into a correlation coefficient by using the usual formula for estimating the correlation attributable to common elements in the variables.

The critical incident technique has been successfully used in a number of situations. One of the first uses was in establishing the critical requirements for the United States Air Force officer. In this instance the incidents were obtained by interviewing officers who had had a considerable amount of military experience. The procedure has been used in determining the critical requirements for research workers in scientific laboratories. In this situation, also, experienced supervisory personnel were requested to provide the incidents. Recently the procedure has been applied to hourly wage workers in one of the divisions of a large industrial corporation. In this situation the foremen supplied the incidents from which the critical requirements were developed. The Committee on Ethical Standards of the American Psychological Association is using a variation of the critical incident technique in obtaining a survey of practical problems in that area.

In the course of these studies a substantial amount of research and developmental work has been accomplished and it is believed that there has now been sufficient experience with the critical incident technique to demonstrate that the critical requirements of a job can be established through direct observations of personnel engaged in the activity.

The adoption of these techniques integrates the problems of job definition, selection and classification, and the development of criterion measures and makes it possible to carry out research on the criterion problem on a sound and rational basis.

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## 2. Problems and Methods in Job Evaluation

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*Herbert Moore*

Reprinted from the *Journal of Consulting Psychology*, 1944, 8, 90-99, by permission of the author and of the American Psychological Association, Inc. Following a discussion of the purpose of job evaluation and the principles on which the practice rests the author critically examines the most widely used procedures and attempts to appraise their value and promise of permanence.

Fundamental to every practise there is or should be a theory or premise; the form that the theory takes when it is applied to a problem varies with the comprehensiveness of vision and the analytical ability of those who apply it; if the application is to endure and to produce permanent results the theory must be sound.

Job evaluation was created in response to a need, and formulated as a

technique to substitute for the hit-and-miss methods that had been used to arrive at estimates of job worth; its development has been concerned with the refinement of that technique or the substitution of others, rather than with a formulation of the theories and implications of the practise.

### PRINCIPLES OF JOB EVALUATION

The principles on which the practise rests can be reduced to four:

*A. The salary or wages paid for a job should be in direct proportion to the effort expended and work done in the job situation.* In practise this has resulted in reducing most jobs to variations of four factors: skill, effort, responsibility and job conditions, in which skill and responsibility are customarily credited with 70 per cent of the job worth, and effort and working conditions 15 per cent each. This obviously reduces the physical effort expended on a job to but a small percentage of the job worth, and by implication places those jobs that are crude expressions of physical exertion at the bottom of the wage scale, and at the same time that it equates skill and responsibility as determinants of job worth.

*B. The wage-earning jobs in any company should be represented by a company wage trend in which increases of any or all of the factors to which jobs are reduced correlate with increased pay to the operators; and these increases should closely parallel the community rate for the job.* This assumes the accuracy of community rates and forces an evaluation system into the structure that is already existing. An essential objective of job evaluation is the correction of wage inequalities; any student of social and economic trends is aware of the fact that the pressure of strong unions has resulted in some jobs being overpaid in relation to others. To set community trend as an arbitrary goal in terms of which the validity of judgments based on analyses of jobs is to be measured is to fall back on G. B. Shaw's attitude toward the world; if job evaluation is to survive it must establish a basis for internal consistency within a company, and set up goals toward which management and labor work regardless of the discrepancies that may exist because of the pressure of labor groups or the niggardliness of management.

*C. For each job there should be an established maximum and minimum that should vary by a consistent percentage throughout all wage-earning jobs in a particular company.* The spread may be anywhere between 15 and 25 per cent, depending on company practise, and may vary by as much as 40 per cent in supervisory and executive jobs. The establishment of a spread is contradictory to the common practise of a flat rate for jobs, and recognizes the principle of individual differences as a factor in determining wage rate; at the same time it acknowledges the fact that job evaluation cannot be effected without the application of a partner that estimates the adequacy with which the job factors are expressed by the different operators; in other words, job

evaluation without man evaluation is only one half of the necessary equipment for establishing an equitable wage structure.

*D. Each job can be reduced to elements that can be converted to percentages of time spent on the job, or can be translated into factors that are psychological abstractions representing fusions of energy, skill, patience and good judgment.* This means that job analyses reduce jobs to one of two bases: elements represented by temporal intervals or factors which are hypothetical entities. The time spent by an operator on any one element is at the best a rough guess, and the value of the element is determined by going rates at the time the valuation was placed on the total job represented by the element. The conversion of any outward expression of a psychological function into one factor is at the best an interpretation and at the worst an assumption of the independent existence of functions or capacities.

### PURPOSE OF JOB EVALUATION

In spite of the questionableness of the assumptions on which job evaluation rests it has survived two decades of practise and has widened its field of usefulness to the level where it now embraces all types of work with the possible exception of the professional group. Job evaluation was first introduced to accomplish four purposes:

- A. To measure and evaluate the relative worth of all jobs within a plant by some impersonal measuring stick, in order to maintain a balanced compensation structure that can be defended on a factual basis.*
- B. To remove all suspicion from the employee's mind that favoritism exists.*
- C. To eliminate grievances that are due to unfair pay differentials.*
- D. To aid foremen and supervisors in their wage and salary administration problems.<sup>1</sup>*

### PROCEDURES IN JOB EVALUATION

To accomplish these purposes there have been four different types of procedures developed—job classification, job ranking, job elements, and point evaluation. An examination of each of them will serve to appraise their value and promise of permanence.

**Job Classification.** This system assumes that jobs in any company differ in terms of one or of a few broad principles which vary in degrees and which can be used as guides for grouping jobs into classes. Such guiding principles as the following have been used:

- a. The number and kind of rules which regulate the performance of the job.*
- b. The degree of responsibility of the job and the extent to which it necessitates independent judgment or/and supervision.*

<sup>1</sup> "Job Evaluation," *Studies in Personnel Policy*, 1940, No. 25, p. 4, The Conference Board, New York.

- c. The types of operations and the level of complexity of tools or machines used.
- d. The level of training and experience required by the job.

On the bases provided by this system some companies have classified their office jobs into 8-11 groups, with varying numbers of subgroups; and others have classified their operating jobs into such major groups as unskilled, semi-skilled, and skilled, and their salaried jobs into interpretative, creative, executive and administrative.

The infrequency with which this system has been used is due to its disadvantages:

- a. The net result of the plan is that jobs are located in broad classes with a considerable spread between both the base and ceiling rates of each class and the base or ceiling rates of different classes. The consequence of this broad grouping is that all jobs in any one class have the same ceiling; and jobs that are borderline between any two classes are either penalized or overpaid.
- b. The resulting classifications are based on overall judgments; these are determined by various means which vary from judge to judge according to the factor or element that guides the formation of the judgment. The result is an accentuation of the importance of one principle or premise and an ignoring of other significant elements in the job situation.
- c. The objection can also be raised that this method is no improvement on the old method of overall estimation of job worth; it provides only general guides for judgment, and uses neither analysis nor weighted appraisal of elements in estimating job worth.
- d. Equally as serious is the fact that this method requires no record of the bases on which judgments are made; when subsequent judgments are made by new members of a rating committee no criteria are available for making comparisons.

The advantages of such a system are:

- a. The system is simple to operate for the reason that members of a rating committee do not spend the time comparing differences in judgment of degree or point value that they will spend when the values assigned to 8-10 disputed factors in jobs are compared.
- b. The system is easy to explain to employees who readily recognized jobs as belonging to an unskilled, semi-skilled or skilled class, or as varying in terms of the necessity for observing many rules or making frequent judgments. However, it frequently results in uncertainty when jobs that occasionally require creativeness or the following of complex rules or the making of independent judgments are being classified.
- c. The system requires the selection of key jobs for each class and the use of these as anchorage points for group assignment. This simplifies job comparison, and may result in as many classes as the management of the company wishes to recognize. The crux of significance lies in the discriminate selection of key jobs and in the liberality of interpretation of job similarity.

**Job Ranking.** This method of classifying jobs is somewhat similar to the man-ranking method, except that the task is preceded and followed by a company-wide organization chart which serves as a preliminary guide to ranking, and as a final form for expressing the relationships.

The usual method is to select one department or division and rank all jobs in order of their value to the organization. This is done by a valuation committee which confers with a departmental supervisor who suggests job ranks for all jobs in his unit. The committee suggests, or agrees upon, the bases for ranking.

When the jobs in each division are arranged in rank order the departments are compared either by selecting key jobs in each department or by agreeing upon a number of levels and assigning jobs to levels according to their departmental rank.

This method has rarely been used; it has suffered the same fate as the man-ranking method and for approximately the same reasons:

a. Those who are asked to rank jobs tend to rank in terms of attitude towards present occupants instead of in terms of the demands and responsibilities of the job.

b. Departmental job comparisons frequently result in increased tensions as relative importance of jobs tends to be reflected in salary levels of supervisors—disagreements among job rankers are often due to personal differences rather than to proven results of objective analyses.

Over against these difficulties the exponents of the method point out its advantages as:

a. The job comparison method leads to fine discriminations because it permits as many job classes as a ranking committee thinks essential.

b. The system permits the grouping of jobs into broad classes and the subdivision of these into groups with varying salary ranges and consequent flexibility.

c. Making the departmental comparisons is of educational value to the supervisors in that they become familiar with the operational processes in other departments, and view the work of their own department in relation to the whole.

**Job Elements.** This method is based on the assumption that each job can be reduced to a number of elements which can be equated with time intervals spent by operators in performing the demands of the element; and that a fusion of the going rates of each element determines the present value of a job. The method was first developed in the Aetna Affiliated Companies and has been limited, with but few exceptions, to office and salaried jobs. It assumes that all clerical work can be reduced to three elements—doing, checking, and supervising the work; and that job differences can be measured by the variations in difficulty and complexity of these elements.

An amplification of the plan necessitates the listing and classifying of the variables in each of these three elements. Such a development has been sug-

gested in a job study plan offered by a Clerical Salary Study Committee of the Life Office Management Association.<sup>2</sup> This committee grouped the "doing" and "checking" operations in office jobs into nine major classes—messenger, sorting, counting, posting, reviewing, balancing, discussing or correspondence, and machine operations. Each of these types of work was further divided into several fundamental clerical operations, with a total (in 1940) of 107 different operations. Examples of such are:

1. Assembling and inclosing of papers.....	840
2. Sorting that involves an examination of material to determine sorting.....	990
3. Counting such items as lines, paper.....	890
4. Posting that involves the interpretation of a few codes.	1170
5. Balancing groups of items to separate records involving series of multiplications or division.....	1280

Supplementing the list of 107 operations is the recognition that the work may be performed under two conditions, with or without check; and in some operations there are two other factors that affect the job value—contacts with company employees or with outsiders.

The "supervisory" elements in jobs also have been more closely defined in terms of four variables—the number of people supervised, the difficulty of the work supervised, the variety of work supervised, and the completeness of supervision. On the basis of these four variables, supervisory tasks have been placed in 44 different groups and further subdivided into complete or partial supervision.

To establish values for these 107 operations and 44 supervisory classes, various company representatives provided estimates of the annual salaries of those whose rank was limited to a single operation or supervisory class; the weighted average of these estimates provided values for the operation. Examples of these values are given with the above illustrations of operations.

To provide values for combination or multiple jobs in which various operations are performed by the same person, the percentage of total working time spent on each operation is estimated, and the corresponding total of percentages of operative values provides the job value; this total value is increased by varying percentages according to the variety of operations performed.

The advantages that this method of job evaluation offers have been listed as:<sup>3</sup>

- a. The isolation of such operations will improve the writing of job descriptions.
- b. An evaluation of the job descriptions can be made in numerical terms based on the relative importance and difficulty of the various operations.

<sup>2</sup> Report No. 4, 1941, pp. 43-56. See Report No. 3, 1940, pp. 33-52 and whole Report No. 5, 1942.

<sup>3</sup> L.O.M.A. Clerical Salary Study Committee Report No. 3, p. 34.

c. Comparison of salaries among other companies will be facilitated by ready detection of job similarities and differences.

The significance and value of this method of job evaluation can only be estimated when it has been applied to a wide variety of office jobs; in its present form the usefulness of the method is limited to large companies and relatively low level jobs. Against its usefulness as a reliable job-measuring tool the following objections may be raised:

a. Assuming that the doing and the checking tasks can be reduced to 107 operations and the supervisory to 44, the task of equating specific operations in any one company with the predetermined categories is complicated by endless variations in different companies; for example, the sorting and delivery of mail and company memos varies in terms of number of stairs to climb, machinery to be circumvented in the factory, outdoor exposure in visiting other buildings, and distance to be travelled. To label mail delivery as one operation is to ignore necessary considerations when selections are to be made.

b. The average or going rates for an operation vary in terms of many variables, especially territorial. To establish community averages for jobs by the same title is difficult in relatively large communities; to establish the same for operations and to delimit these by variables and establish community rates for these is not only difficult, it is impossible, for the same operation under the same conditions is rarely repeated.

c. Even if the list of operations in office jobs could be completed and the group of 151 operations increased many times, the variations in the same operations in different companies and in the same company at various parts of the plant are so many that a descriptive qualitative and quantitative variance factor must necessarily be added. To add that variable and hope to establish company and community rates for different degrees of the operations as a full time task is impossible.

d. Values for multiple operations are based on coarse estimates of the time spent on the different operations. Assuming that operations done by the same person vary in value by as little as 25 per cent and that the time estimates are approximately correct (which is a rare phenomenon) the debatable stand is taken that the pay rate for the job should be the gross total of the varying percentage values, supplemented by an over-all percentage that increases as number of operations performed by the same person increases. This method of estimating job value is opposed by many unions and by much current practise that goes on the theory that the standard rate for a job should be the price of its most difficult task.

A job evaluation system that is adopted must be fair to the operator and to the company; one that is based on a theory that runs counter to common practise is not readily accepted either by union or management.

**Point Evaluation.**<sup>4</sup> This is the most widely used method and the plan that includes the essential features of the others with some supplementary techniques that are assumed to increase the accuracy of its disclosures. This

<sup>4</sup> A combination of the point evaluation and the job ranking method, under the caption, factor comparison method, has been developed by Benge, Burk, and Hay.

method assumes that all the jobs in any company can be reduced to a number of factors which are expressed in varying degrees in the different jobs, that these factors can be reduced to statistical values and equated with equitable wage ranges, and that the disclosures can provide relative values of jobs. Before discussing the problems involved in developing and applying the system, both its advantages and disadvantages will be listed.

**Advantages:**

- a. Point evaluation provides raters—supervisors, union representatives and executives—with training in analytical methods and brings to their attention all the factors that should be considered in determining job worth.
- b. Point evaluation provides common standards in terms of which all raters make judgments and express results. By converting these standards into simple numerical relations, the relative importance of conditions represented by the factors can be expressed with exactness and definiteness.
- c. The point value of the factors can readily be converted into wage rates that ensure consistency of relationship throughout the wage structure.
- d. The net result is a grouping of jobs into a number of classes that cross conventional groupings and that can be expressed in terms of wage-rate increase, promotional steps, or divisional levels, or that can be expressed as a specific wage range for each job that varies from one job to another.
- e. The resulting wage structure provides management with a consistent relationship between jobs and with uniform wage boundaries for range values that maintain the same rates of spread throughout the scale.

**The disadvantages and possible pitfalls of this method are:**

- a. The results are expressed in numerical values which imply a degree of exactness that does not express the variations in judgments.
- b. Each job is analyzed into 8 to 15 factors and each factor into 3 to 7 degrees. To estimate the worth of each job there are from 25 to 125 judgments made by 3 to 5 people. The possibility of error and the necessity for frequent compromise in order to effect progress are ever present.
- c. The results are expressed in mathematical relations which represent job groups. The spread between the extremes of any group is usually larger than the spread between the top 30 per cent and bottom 30 per cent of two adjoining groups, and yet jobs in the higher group are priced at an hourly rate of two to five cents above the lower. Justification for the grouping is difficult unless a considerable margin of error is recognized; that recognition runs counter to the assumption that the system provides for the proper evaluation of small differences.

In spite of these danger points the Point Evaluation system is the most widely used method today. The principal steps necessary for applying the system, together with an estimate of the validity of the techniques comprise the balance of this paper.

- a. *Gathering Job Data.* This is secured by one of three methods—completed questionnaires by employees, from inspection of the jobs by the job analyst,

and by means of an interview with the foreman after the job analyst has inspected the jobs. The first of these methods is cumbersome, and usually incomplete and inaccurate; the second varies in completeness with the job familiarity and analytical and interpretative capacity of the analyst; the third depends upon the capacity of the analyst to separate the wheat from the chaff in discussing the jobs with each foreman.

*b. Writing Job Descriptions.* This job is the second step in the process and depends for its accuracy upon the ability of the analyst to describe the job demands in terms of its purpose, its content, and its occasional tasks. Incidental to the description is the ascription of proper title to the job; the Dictionary of Occupational Titles provides an exact guide in many instances and suggestions for both titles and groupings in most cases.

*c. Analyzing Jobs into Factors.* In this step there are two important problems: the selection of factors and the analysis of the job into the degree of each factor demanded by the job. The factors may be selected arbitrarily or may duplicate such already existing scales as the National Metal Trades or the General Electric system; or the factors may be selected after the job descriptions are completed. In either case the factors are commonly arranged in four groups—skill, responsibility, working conditions and effort, with such sub-divisions of these as are necessitated by the different jobs. Whichever group is used the factors selected should conform to the following principles:

1. They should be sufficiently comprehensive to include all the elements in the jobs being evaluated.
2. They should not duplicate one another, thus avoiding double credit for performance of any one function.
3. They should lend themselves to gradation and be expressed in various degrees in different jobs.

The degrees into which each factor is subdivided are determined by the variations demanded by the different jobs. That variation may be expressed by the job-factor-degree comparison method, in which jobs are compared from the standpoint of expressing, for example, skill, or mental effort; or the degrees may be expressed in descriptive form, and the job expressions matched against the step description. The advantage of the latter method is the consistent guide that it provides for comparing the expression of the factor in different job situations.

*d. Weighing the Factors.* This is usually done in one of three ways: (1) predetermined weights that have been found effective in comparable job situations or that are used by existing scales, (2) a selected total that is divided among the several factors by comparing the most significant expression of the different factors in the jobs and assigning a maximum value to each one in terms of the relative significance of these expressions, and then graduating these maxima on a geometrical or arithmetical progression scale, (3)

equating key jobs with current annual values of these jobs, analyzing the part played by the different factors in each of these jobs and after assigning arbitrary percentages of the total value to each, translating the cash price of the job into point values on the scale. In any case the weights given the different factors can be validated only in terms of the end result of the evaluation effort; they cannot be statistically justified (at least they have not been), and their values vary in different factors in comparable companies by as much as 25 per cent. The test of their adequacy is the extent to which the end result provides a distribution of point values, when checked against current job rates, that display a consistent percentage increase throughout the wage structure.

*e. Job Pricing.* The end result of job evaluation is the setting of acceptable prices to individual jobs or groups of jobs. The process by which this is accomplished, once values have been assigned to the different factors in each job, is:

1. Plot the point values of the jobs against the weighted average of each job.
2. Establish a trend line that represents the relations between the different jobs or groups of jobs. This trend line ideally should be of the linear function type, but may be of an ogive form because of (a) Local overpricing due to a conflict between supply and demand of certain types of labor, (b) Overweighting of some factors in relation to others, (c) Company and community policy to pay unequal differentials between wage earning groups, for example, between unskilled and semi-skilled, or skilled and foremen groups. To establish a company trend line, the community rates of comparable jobs must be ascertained, and the company trend line converted to a close approximation of community rates.
3. The trend line represents the average point values of groups of jobs plotted against the average current price of these jobs. To establish job prices, a range of values for each job should be established that is consistent throughout the wage structure. Internal consistency is an essential for equitable wage adjustments. This is most easily secured by establishing a consistent percentage spread (varying from 5 to 15 per cent on either side of the trend line); the base representing the minimum or hiring price, the ceiling representing the maximum price of the job.

The above five problems are the chief factors for consideration in establishing a job evaluation structure, but incidental to its establishment there are other issues that should be cared for before the wage program is put into effect; the chief of these are:

- a.* The cooperation of management and labor in developing the program; the bases on which the structure rests must be understood and accepted by both, if it is to act as a guide in determining job worth.
- b.* The establishment of promotional steps that are controlled by temporal spans and merit-rating procedures that estimate the same factors in the men that have been used in estimating the job. In an adequate wage structure each job will have a price variation of 15-30 per cent. The location of an employee

on that spread can only be properly estimated by merit rating that has direct relation to job factors.

c. The training of a member of the personnel department and a rating committee to carry on the program. Job values are not static; they change with every major change in job techniques and procedures, and with every addition to or subtraction from the demands of the job. To ensure permanent values for a wage structure all jobs should be appraised shortly after changes in procedure are established.

d. Jobs that are out of line with the current trend should be corrected; approximately 15 per cent of jobs in the average company are either below the base or above the ceiling of the trend line. Those below the base line can be corrected easily; those above the ceiling cannot be so easily corrected, for the usual procedure necessary to make such correction—decrease in salary or change of job to another job that is the same value as that being paid a worker for an overpaid job—cannot quickly be effected. The established trend provides a goal towards which management works by replacing overpaid men by true value employees, as those who are overpaid are trained for more responsible jobs or are retired.

e. An incidental and essential part of job evaluation is the writing of job specifications, on the basis of which candidates for positions are evaluated and objective standards are established for appraising candidates. Thus the personnel department is provided with standards of acceptability and the testing department is provided with a definite list of job demands in terms of which tests of every known variety may be developed to provide estimates of candidates' promise. Job evaluation thus becomes a tool that is basic to satisfactory management-labor relations and to adequate personnel selection, at the same time that it provides the bases on which a testing program may be developed and a merit-rating and promotional scheme organized.

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### 3. Method of Paired Comparisons and a Specification Scoring Key in the Evaluation of Jobs

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*G. A. Satter*

Reprinted from the *Journal of Applied Psychology*, 1949, 33, 212-221, by permission of the author and the American Psychological Association, Inc. Despite frequent recommendation by industrial psychologists the methods of job evaluation described in this report have rarely been used in industry. One procedure involves the application of the method of paired comparisons and the other, the development of scoring keys which can be applied to job specifications. Both procedures are oriented toward developing a scale the points of which are defined by jobs and which can be used in making the kinds of job measurements which are helpful in setting up wage schedules.

Within recent years, public and industrial employers have increasingly attempted to place their wage structures on objective bases. Among the techniques employed to this end are those which are commonly referred to as "job evaluation methods." Collectively, these methods represent attempts to rate jobs in order to determine their relative worth with respect to other jobs and to use the job's standing, within the group of which it is a member, as a basis for assigning a dollars-and-cents value to it.

The most widely used methods fall into four general classes: (a) Those in which the operation of evaluation is one of comparing job against job in terms of the job's overall worth (Ranking Method); (b) in which it is one of comparing job against job in terms of specific "elements" or traits (Factor Comparison Method); (c) in which it is one of comparing the job against an arbitrarily defined scale of overall worth (Classification Method); and (d) in which it is one of comparing job against arbitrarily defined scales covering individual job traits or "elements" (Point Evaluation Method).

From time to time, various authors have described alternatives to, or modifications of, the above basic methods but for the most part these methods have retained their popularity with surprisingly few modifications. Thus, Viteles (10) and, more recently, Otis and Leukart (7) have recommended that the Method of Paired Comparisons be used as an alternate to the Ranking Method. So far as the present writer knows, no organization has ever given this recommendation a trial. Similarly, there are other scaling methods which might profitably be applied to the problem of jobs; on its face, the problem of scaling jobs does not seem to be pronouncedly different from

that of scaling other subject matters. These alternative methods, too, have been neglected.

The present report describes the results of applying two psychometric techniques to the problem of building job scales in two industrial plants. One procedure involves the application of the Method of Paired Comparisons and the other, the development of scoring keys which can be applied to job specifications. Both procedures are oriented toward developing a scale the points of which are defined by jobs and which can be used in making the kinds of job measurements which are helpful in setting up wage schedules.

### I. CONSTRUCTION AND CHARACTERISTICS OF JOB SCALES BUILT BY THE METHOD OF PAIRED COMPARISONS

**The Jobs Studied.** The investigations reported here were carried out on the clerical jobs of two comparatively large, Midwestern, paper mills. In one mill (Plant A), 70 jobs supplied the subject matter of study; in the other (Plant B), 33 were studied. The group of 103 jobs covered a wide range of clerical skills; within the population were included Messenger and Mail Boy, the clerk classifications of accounting, purchasing, sales, billing, and scheduling departments, the specialized jobs associated with the operation of electric punched card equipment, and the supervisory jobs immediately associated with the jobs mentioned above.

**The Job Analysis.** In both of the plants, preparatory to the scaling project, all of the jobs were subjected to intensive study. The study methods were modeled after those developed and used by the United States Employment Service (11). In each plant, trained job analysts, working down the organizational chart, interviewed and observed to the organizational level of the jobs under study. The data collected thus represented the joint opinions of the employee performing the job, the supervisors immediately responsible for the job, the departmental head under whose jurisdiction the job fell, and the job analyst whose responsibilities were those of collecting, collating, and organizing the data into a formalized job description. The job descriptions were reproduced in final form only after the employees and supervisors who supplied the original data were given an opportunity to review and then to endorse them. In both plants, the completed job descriptions<sup>1</sup> were assembled in bound form, and in this form they served as the raw materials on which the judgments called for by the scaling operation were made.

<sup>1</sup> These job descriptions contained considerably more detail than one conventionally finds in the descriptions prepared for a job evaluation project. The objective in each case was to provide the reader, even though he had little previous contact with the job, with enough detail to permit a judgment of the skills and knowledges which it required, the responsibilities which it entailed, and the conditions under which it was typically performed—in short, to arrive at judgments concerning those characteristics which are conventionally associated with job worth.

**The Collection of the Scale Data.** In both plants the judgments called for by the Method of Paired Comparisons were made by those persons within the organizational structure who were presumed to know the jobs in question best, namely, the personnel working at them and the supervisors immediately responsible for them. In Plant A, thirteen judges (7 working on the jobs and 6 supervising them) and in Plant B (5 and 5) constituted a "scaling committee." The members of these two committees were called together for an orientation meeting by their respective industrial relations departments. At these meetings, the objectives of the project were outlined, the procedures to be used were reviewed, and the members of the committees were given the materials which they were to use in arriving at and reporting their judgments. These materials consisted of a bound volume of the job descriptions, which had been prepared earlier, and a set of forms on which their judgments were to be recorded. It was then possible for the members of the committee to proceed independently, and at their leisure, to make their judgments. It might be pointed out here, that the routines of the Method of Paired Comparisons are particularly well adapted for use in the industrial situation. Since comparatively naive judges can be introduced to the task called for by the method with a minimum of training, it is possible to work with large numbers of judges who can proceed independently under a minimum of supervision.

By following this general procedure, the jobs in the two plants were scaled independently on four traits or "elements" which a preliminary review of the literature of job evaluation indicated as being potentially most useful in discriminating between clerical jobs. For purposes of the evaluation, these traits were defined in the following manner:

- a. *Educational Skills.* The degree to which the job demands preparatory skills (verbal, quantitative, etc.) which are most generally acquired in the schoolroom.
- b. *Work Skills.* The degree to which the job demands specialized skills which can only be acquired either through job training or by extended experience on the job.
- c. *Application Skills.* The degree to which the job makes special demands on the individual worker; the degree to which the job is unpleasant, tiresome, monotonous, dirty, etc.
- d. *Social and Personal Skills.* The degree to which the job requires human-relations skills—skill in supervising and in coordinating the activities of others.

Thus, both groups of judges were required to make their inter-job comparisons in four frames of reference. If the Method of Paired Comparisons had been used in its traditional form, this would have meant that each judge in Plant A would have had to make  $[n(n - 1)/2]$  4 judgments (9,660) and those in Plant B, 2,112. To reduce the number of pairs of jobs in Plant A to a more feasible number, a suggestion which Uhrbrock and Richardson (9) made earlier was followed. By using key jobs, against which all comparisons

were made, and groups of ten jobs in which only the in-group comparisons were made, the total number of judgments made by each judge was reduced from 9,660 to 3,660. These job groups were set up in the following manner. The investigating staff selected from the group of 70 jobs ten which in their opinion seemed to fulfill the dual criterion of being generally well known and which collectively represented the entire range of abilities required by the seventy. These constituted the "key group."<sup>2</sup> The sixty remaining jobs, then, were assigned to groups of ten in a random fashion. In preparing the worksheets for the judges, a scrambled order of pairs was used; each job title was presented first in half of the pairs; and the pairs involving the key jobs were interlaced throughout the whole list. No judge was informed that the key job device was being employed. In Plant B, the judges' Worksheets called for the complete set of 2,112 judgments. Apparently, as we shall see later when the results from the two plants are compared, the modified procedure employed in Plant A did not distort the final results. Making and recording the judgments required from six to ten hours of the judge's time.

**Computation of the Scale Values.** The data from each group of judges were summarized and, following a "shortcut" procedure recommended by Guilford (2), the scale value equivalents of each job were computed. This procedure was employed in preference to that called for by Thurstone's Case V of the Law of Comparative Judgment for the following reasons: (a) The small number of judges used hardly warranted the laborious operation of computing the several estimates of each scale separation which is required by the Thurstone procedure and (b) Guilford (2) has demonstrated empirically the comparability of scale values derived from using his abbreviated procedure and those derived from Case V procedure.

## RESULTS

The results of the operations described above were four skill scales which were presumed to be capable of measuring the dimensions on which wages for clerical jobs are commonly paid. At this point, the problem of combining the measurements yielded by these scales arises. If a suitable criterion is available, multiple correlational procedures are probably most appropriate. In a certain sense, the validation of job scales presents an even more difficult problem than is typically encountered in the validation of employee selection instruments; here, the problem is not only one of measuring the criterion, but, in the first place, of defining one. Lacking more suitable standards, in the typical wage evaluation project, job measurements are evaluated in terms of how well they reproduce the existing wage structure in the plant or the

<sup>2</sup> The key jobs were: Dark Room Technician, Junior Stenographer, Mail Boy, Payroll Clerk, Record Clerk, Scheduling Clerk, Secretarial Assistant, Statistical Supervisor, Stenographer, and Telephone Operator.

wage structures of other similar plants in the area. Both procedures obviously have serious shortcomings.

In the project described here, wage survey data for similar jobs outside the plant were assembled with the expectation that these data might be employed as a "criterion." Preliminary tabulations made it quite obvious that these data were incapable of generating correlation with anything, even themselves; the differences in wages paid for what were presumed to be similar jobs were often times as large, or even larger, than those which existed between different jobs. Accordingly, in both studies, the plants' prevailing rates were used as criteria in combining the scale values of the four skill scales.

A multiple regression equation was written for predicting rates from scale values. The multiple R's resulting from the application of the regression equation were .77 and .83 in Plants A and B respectively. In both plants, the Work Skills Scale contributed the most toward accounting for the total variance of "going rates." Apparently then, the kinds of measurements made by paired comparisons can yield measurements which are capable of ordering jobs with respect to their worth. The results reproduced in Table 1 also reveal

TABLE 1. INTERCORRELATIONS OF THE SCALE VALUES DERIVED FOR EACH OF FOUR TRAITS AND THEIR CORRELATIONS WITH RATES

Trait	Plant A *				Plant B *			
	2	3	4	5	2	3	4	5
1. Educational skills.....	.93	-.49	.73	.71	.89	-.37	.74	.73
2. Work Skills.....		-.39	.75	.71		-.40	.82	.82
3. Application Skills.....			-.34	-.14			-.57	-.42
4. Social and Per. Skills...				.66				.70
5. Going Rates.....								

\* None of the inter-plant differences in the *z*-equivalents of the *r*'s attain statistical significance.

that even better scales might be developed; the skill scales obviously do not measure independent dimensions. This would suggest: (a) that the original choice of the traits was a poor one; (b) that the traits were poorly defined; and/or (c) that the judges were not highly proficient in making the kinds of discriminations which this project called for.

Other characteristics of the scale values derived here may be pointed out. For one, the analyses suggest that these values are in general independent of the particular population of jobs chosen, *i.e.*, that they have general validity. The correlations between the scale values of jobs in Plant A and those for

jobs in Plant B, which the job analysis data indicated as similar in content, are presented in Table 2. These findings should be of special interest since

TABLE 2. CORRELATIONS BETWEEN THE SCALE VALUES DERIVED IN PLANT A WITH VALUES DERIVED FOR TWENTY-THREE SIMILAR JOBS IN PLANT B

Job Trait	$r_{AB}$
Educational Skills.....	92
Work Skills.....	92
Application Skills.....	34
Social and Personal Skills.....	91

they suggest that "standard scales" are feasible—that scales can be developed which will be of general applicability in job evaluation projects.

Further analyses of these data suggest high consistency in the judgments made by the several judges. Table 3 summarizes these findings. The coeffi-

TABLE 3. RELIABILITY OF THE JUDGMENTS ON WHICH THE SCALE VALUES WERE BASED

Job Trait	Plant A		Plant B	
	$r_{II}$	$r_{AA}$	$r_{II}$	$r_{AA}$
Educational Skills.....	805	982	941	993
Work Skills.....	777	978	911	990
Application Skills.....	623	956	826	979
Social and Personal Skills....	812	983	904	989

ients reported in Column  $r_{II}$  are average intercorrelations between judges (5) and may be regarded as estimates of the reliability of the individual judge's judgments; those in the  $r_{AA}$  Column are the estimates resulting from applying the Spearman-Brown prophecy formula to the  $r_{II}$  values. Using comparatively large groups of evaluators obviously results in highly reliable judgments. These coefficients compare quite favorably with the few that are reported for "point-evaluation" judgments in the literature (4, 6). Further, from the above it may be presumed that the individuals who constituted the scaling committee were quite homogeneous in their outlooks toward the jobs which they evaluated—this, in spite of the fact that the committee membership was chosen to represent both employee and supervisory points of view. The correlations between the sums of employee and management judgments are reported in Table 4. This finding would suggest, then, that the attitudes of the judges who participate in a job scaling project (if we can assume that there were differences in the attitudes of the members of our groups) are not likely to color their judgments of the jobs. This finding is consistent with

TABLE 4. CORRELATION BETWEEN THE SUM OF JUDGMENTS MADE BY EMPLOYEE AND MANAGEMENT REPRESENTATIVES

Job Trait	Plant A <i>r</i> 's	Plant B <i>r</i> 's
Educational Skills.....	96	99
Work Skills.....	93	98
Application Skills.....	92	94
Social and Personal Skills.....	95	91

the findings of other investigators (1, 3) who have studied the scale values assigned to opinion statements by judges who differ pronouncedly in their attitude toward the object being investigated.

#### SUMMARY: THE METHOD OF PAIRED COMPARISONS

In two investigations jobs were scaled on four traits by using the Method of Paired Comparisons. The results of these investigations indicate that jobs can be scaled on these dimensions and that the measurements yielded by such scales can effectively be used to order jobs in a fashion which is valid for rate setting. The findings further suggest that the method used results in scale values which are independent of the particular population of jobs chosen.

At the practical level, the methods employed are particularly well adapted for industrial usage: (a) They permit the participation of large numbers of evaluators; (b) they can be employed with comparatively naive evaluators *i.e.*, little training time is demanded; (c) even untrained evaluators report little difficulty in making the judgments called for; (d) the judgments can be made with a minimum of supervision and follow-up review; and (e) the resulting measurements are highly reliable.

#### II. CONSTRUCTION AND USE OF A SCORING KEY FOR A JOB SPECIFICATION FORM

In the same plants in which the investigations described above were made, trained job analysts collected and summarized other job data; they prepared specification forms which in form and content were somewhat like the *Worker Characteristics Form* employed earlier by the United States Employment Service in its job studies (11). The items, of which there were eighteen, covered various aspects of the skills and knowledges required by the jobs analyzed.<sup>3</sup> Each item was prefaced by a brief statement defining a particular skill (or knowledge) and this was followed by three or four alternative

<sup>3</sup> See Table 4.

phrases or statements descriptive of various degrees of skill. These alternatives were drawn up arbitrarily to definite approximately equal distances along the skill scale. The following is a sample item:

Responsibilities for planning and laying out work.

- a. All work planned and laid out by the supervisor.
- b. Particular class of tasks allocated to worker; lays out own schedule according to established routines.
- c. Works on a job basis but has the responsibility for setting up own work operations and schedule.
- d. Particular class of tasks allocated to worker; responsible for setting up own work operations and schedule.

**Collection of the Data.** As in the case of the job description preparation, described in Section I, the ratings called for by the specification forms were made on a cooperative basis by the job analyst, the immediate supervisor, and by the employee performing the job. One hundred and three such forms (70 in Plant A and 33 in Plant B) were prepared. These data supply the basis for the analysis reported in this section.

**Analysis of the Data.** Collectively, the items of the job specification form cover the same subject matter that was dealt with in the two scaling projects

TABLE 5. CORRELATIONS BETWEEN THE ITEMS OF THE SPECIFICATION FORM AND GOING RATES AND THE STANDARD DEVIATIONS OF THE INDIVIDUAL ITEM RATINGS

Item on Specification Sheet	r	S.D.
1. Formal schooling demanded by the job.....	.46	.60
2. Skill in the use of numbers and numerical operations.....	.55	.75
3. Skill in the use of words—spelling and vocabulary.....	.29	.81
4. Skill in reading.....	.29	.99
5. Vocational training needed for the acquisition of job skill.....	.08	1.94
6. Training on the job.....	.61	1.72
7. Kind of supervision received on the job.....	.37	.91
8. Responsibility for planning and laying out work.....	.72	.82
9. Responsibility for making decisions.....	.58	.40
10. Conditions under which work is performed.....	-.03	.39
11. General nature of work—interesting, stimulating or routine and dull.....	-.28	.41
12. Physical demands of the job.....	-.04	.39
13. Supervision given to other workers.....	.52	.53
14. Relationships with other workers on the job.....	.32	.51
15. Relationships with persons outside the department.....	.46	.96
16. Skill in oral expression.....	.46	.72
17. Ability to maintain confidences.....	.31	.50
18. Appearance and dress requirements.....	.10	.35

described above, so it seemed reasonable to presume that the ratings reported on the specification sheets might be turned to the same usage as the paired comparisons data—namely, to order jobs with respect to their worth. Accordingly, a scoring key was developed for these items.

Each of the 18 ratings for the 70 jobs in Plant A was correlated with "going rates" and an equation was written for combining the "scores" of the individual items. In this equation, the individual item ratings were weighted in terms of their correlation with rates and the reciprocals of their respective standard deviations.

### RESULTS

As a check on the accuracy of the scoring key developed (*i.e.*, the ability of the key to reproduce the criterion on which it was built), the 70 specification forms were scored and the resulting scores correlated with rates. The coefficient was .89. Undoubtedly with further statistical manipulation of the item weights a larger proportion of the criterion variance could have been accounted for. The operation of correlating scores with the criterion on which the scoring key was originally built is, of course, no check of either the validity of the procedure nor its general usefulness. Accordingly, a similar set of specifications, which was developed in Plant B by another group of job analysts, was scored with the key developed in Plant A; again the resulting scores were correlated with rates. In Plant B, specifications correlated .92<sup>4</sup> with rates. Thus, when an independent criterion and a new population of jobs is employed, the scoring key is found to be quite satisfactory.

### SUMMARY: A SCORING KEY FOR A JOB SPECIFICATION FORM

The procedure used in the development of a scoring key for job specifications forms has been described. Such a scoring key was found to yield scores which are related to wage payments made to clerical workers. There is some evidence to support the conclusion that such a scoring key developed in one plant may be of general usefulness in evaluating similar jobs in other plants.

### DISCUSSION

The two approaches to job measurement described here may be compared and contrasted. As indicated above, they yield results which are very similar so that one's choice between them would probably be governed by considerations other than one of accuracy or validity of measurement. First, it might be pointed out, the scoring key resulting from the application of Method Two, can be developed in a much shorter period of time primarily because

<sup>4</sup> Note that this coefficient is slightly higher than the one obtained on the initial check validation. The difference in these two values does not attain statistical significance.

the volume of data dealt with is much smaller; in contrast, the Method of Paired Comparisons, even when "short cuts" are employed, is always cumbersome. Further, with Method Two, once adequate job analysis data have been collected, it is a comparatively simple task to collect the judgments called for by the job specification; but, it must be borne in mind that judgments of this sort can only be made by persons who have very intimate contacts with the jobs for which they are preparing specifications. Training of the evaluators might, of course, overcome this limitation.

It might be argued then, that the Method of Paired Comparisons is more suitable for those kinds of projects where: (a) it is desirable to make the scaling project a cooperative one with comparatively large judging groups representing all interests, and (b) where one has a minimum amount of time to devote to the training of the judging group. Apart from the fact that paired comparisons data are generally highly reliable, and that the method has a well-established theoretical basis, the above characteristics, in many industrial plants, would strongly recommend this method.

On the other hand, it is the writer's opinion, that the scoring-key method may be particularly valuable in certain special circumstances. Once such devices have been developed, they may be of particular usefulness in those situations where a comparatively small number of new jobs needs to be slotted into an already established wage structure. Or, again, where the manufacturing unit is so small as to make other more elaborate procedures impractical. The scoring-key method can easily be used as a supplement to any of the commonly used job evaluation schemes.

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#### 4. The Reliability of Job Evaluation Ratings

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*Philip Ash*

Reprinted from the *Journal of Applied Psychology*, 1948, 32, 313-320, by permission of the author and of the American Psychological Association, Inc. It is the author's contention that relatively little study has been made of the reliability of job-evaluation ratings. This paper reports a study of the reliability of rating judgments made by trained job analysts. It is believed that some of the results presented will be applicable to any job-evaluation installation and will suggest directions for future investigation.

While a number of papers have been published recently concerning the validity and internal consistency of job evaluation systems (1), (3), (4), (7), little systematic study seems to have been made of the reliability of job evaluation ratings. Rather, on the one hand reliability has been assured (or assumed) by the rating methods used, or on the other hand the limitations demonstrated in connection with personality and other trait ratings have been imputed to job evaluation ratings (5), (8).

The writer believes that a great deal of merit inheres in both of these positions. In many companies using formal job evaluation systems job evaluation ratings are assigned by a process of group discussion and compromise. This practice reduces considerably the importance of independent rater-to-rater consistency. It is also true that a prior analysis would reveal a great similarity between the process of assigning a point rating to a job with respect to, say, "physical effort requirements," and the process of assigning a rating to an individual with respect to, say, "sociability." To that extent the results of study of the latter type of rating judgment apply equally to the former.

The problem vis-à-vis job evaluation ratings still warrants independent investigation, however. In large companies it is common to find jobs "re-allocated" and new jobs rated by a single analyst, for whose judgment there is no measure of reliability. Furthermore, there is good reason to believe that the analogy of personality trait ratings does not cover all salient points.

This paper reports a single study of the reliability of rating judgments made by trained job analysts. It is believed that some of the results presented here will be applicable to any job evaluation installation, and will suggest directions for future investigation.

**Description of the Project.** One of the products of occupational research conducted by the Division of Occupational Analysis is Part IV of the Dictionary of Occupational Titles (9). This volume offers a classification of occupations into homogeneous groups, "families" or "fields of work." In each group the occupations are related on the basis of similarities in knowledges, skills, aptitude requirements, and other functional criteria. However, in preparing a revision of the volume it was decided to order the occupations within each group in terms of skill level. The skill level hierarchy could be used to indicate points of entry, promotional sequences, and channels of advancement. To accomplish this skill-level ordering, a point-rating job evaluation system was devised. Since it would not have been feasible to hold group rating discussions for each of the twenty-three thousand occupations to be included, some estimate of the probable reliability of individual analyst ratings was needed. A pilot study was therefore devised for this purpose.

Five questions were posed for investigation:

1. How reliably does the average analyst rate jobs (rater-to-rater consistency)?
2. Do differences in consistency of rating appear between the various job evaluation factors?
3. Are there any factors for which particular jobs cannot be rated consistently, even though the over-all consistency of rating on these factors is high?
4. Are there any jobs which cannot be rated consistently, due to lack of information or for other reasons?
5. To what extent do the factors overlap?

**The Job Evaluation System.** A study was made of twenty-two of the most widely-used job evaluation plans. Nine factors, including what appeared to be all relevant components of the skill level of a job, were selected and defined. The factors included knowledge, physical skills, adaptability and resourcefulness, responsibility for material goods, responsibility for safety, responsibility for the work of others, physical effort, attention, and working conditions. The definitions were given in considerable detail. For example, the definition for the factor physical skills read: "The dexterities, coordinations, and muscular discriminations required for successful manipulation of materials, tools, machines, or equipment to effect successful job performance. Evaluate developed physical skills involving any one or combination of: dexterity of fingers or other members, coordination of senses, hands and/or feet. Consider the complexity of necessary movements and the frequency and speed demanded; degree of coordination required between sensory cues and movement responses; accuracy or precision of movements or muscular

judgments required; repetitiveness of movements; independence of finger, hand, foot, and/or leg movements."

*The Job Sample.* A sample of twenty-seven occupational descriptions was selected for the purposes of this study. Each description was a composite summary of information collected in from two to twenty-five independent job analyses. A description therefore constituted a detailed statement of the characteristics typically associated with the occupation, together with an indication of deviations from this average in the plants in which the basic job analyses were prepared. Each description included a statement of the duties performed in the occupation, machines, tools, and other work-aids used, working conditions and hazards involved, hiring requirements (sex, education, previous experience), promotional lines, and estimated worker characteristics (degrees of strength, dexterity, intellectual ability, and so forth) required for successful performance.

It should perhaps be pointed out that the findings in this study relate to the reliability of ratings of the job descriptions. No analysis was made of the objectivity, reliability, or validity of these descriptions *vis-à-vis* the actual jobs.

This is a problem common to all job evaluation programs, and one which might well merit study. What is usually subjected to rating is a brief abstract from the mass of data that constitutes a job. It may well be that points decisive for a fair skill level evaluation are overlooked, that biases and deficiencies in the original observations seriously distort rating judgments.

It may be pointed out, however, that in view of the fact that the Division has had over thirteen years' experience in developing the techniques of job analysis, and has established methods that yield consistent agreement among job analysts with respect to the characteristics of jobs studied, there is a presumption in favor of the validity of the descriptions used here.

The specific jobs included in the sample were: bookkeeper, bootblack, cabinetmaker, clerical checker, chef, ditch digger, deep-sea-diver, spinning doffer, heating and ventilating equipment draftsman, garment factory foreman, gardener, hat designer, machine oiler, metal machinist, olive packer, paper cutter (machine), physician (on a ship), plasterer, bull-ladle pourer, president of a refrigerator manufacturing company, punchpress operator, housefurnishings salesman (retail), petroleum stillman, hand trucker, typist, night watchman, window calker. This range of jobs is considerably greater than that found in a typical plant. It is probably only a very restricted sample of the jobs in which the USES is interested.

*The Analysts.* Ten job analysts participated in the study. All of them had had considerable experience in job analysis, occupational classification, and related phases of occupational research. The range of experience was from two to twelve years; the mean for the group was 4.8 years' experience. In addition, a training session was held to discuss the purposes of the study, to

review the factor definitions, and to ensure that uniform procedures would be followed.

*Procedures.* Each analyst was provided with a complete set of the descriptions and the factor definitions. Since no point-values had been established, the analysts were instructed to rank the sample for each factor, treating each factor independently to reduce any halo effect which might operate. The job ranking lowest was assigned the number "1," the job which ranked highest was assigned the number "27." As necessary, adjustments were made for ties.

*Statistical Findings. Reliability of the Raters.* For each job, the median of the analysts' ranks for each factor was determined. The rankings of each analyst were correlated with the median array for each factor. Using the resulting correlation matrix a median coefficient was determined for each factor and for each analyst.

In addition, for each factor an average intercorrelation coefficient was calculated. These coefficients are given in Table 1.

Analysis of Table 1 suggests that, given trained analysts, a very high degree of consistency in job evaluation ratings may be obtained. The range of the reliability of the analysts, expressed in terms of the median of the correlations made by the analyst on the nine factors, is from .81 to .94.

Furthermore, of the ninety coefficients giving the correlation of the rankings of an analyst on a factor with the median rankings for the factor, forty-nine exceed .90, twenty-six are in the range .80 through .89, twelve are in the range .70 through .79, and only one is very low (.25). This last is the only coefficient which might have been obtained merely on the basis of chance expectancy.

*Differences in Consistency with Respect to the Factors.* The reliability of the differences among the various correlation coefficients was not calculated. Examination of the quantites in Table 1 will indicate the general picture, however.

The average intercorrelations are perhaps the most pertinent indices with respect to factor consistency. As is to be expected, they are somewhat lower than the medians of the individual correlations for each factor. The average intercorrelations suggest the probable magnitude of the reliability of a single ranking. They are therefore more revealing in relation to the question of independent rater-to-rater consistency. It should be noted that, while these coefficients all exceed chance expectancy by a wide margin, they range in magnitude from .39 ("attention") to .93 ("adaptability").

It is pertinent to observe, with respect to the factor "attention," however, that the coefficient reflects the extreme disagreements of analyst C. If analyst C's rankings were dropped, the average intercorrelation coefficient would be raised to .59, which would be comparable to those for "physical effort" and "responsibility for the work of others."

TABLE 1. RELIABILITY OF RANKINGS ON NINE JOB EVALUATION FACTORS

Note: 27 jobs, ten analysts are involved

Factors	Analysts									Median <i>r</i>	Ave. <i>r</i>
	A	B	C	D	E	F	G	H	I		
Knowledge.....	.94 *	.97	.97	.94	.98	.95	.95	.96	.95	.97	.95 **
Adaptability.....	.93	.90	.82	.96	.97	.96	.94	.95	.95	.98	.95
Physical Skills.....	.74	.85	.84	.94	.87	.88	.90	.82	.92	.79	.77
Responsibility for Materials.....	.75	.77	.70	.94	.91	.86	.87	.88	.86	.88	.86
Responsibility for Safety.....	.77	.93	.92	.83	.96	.94	.77	.92	.82	.86	.89
Responsibility for Work of Others.....	.85	.94	.78	.88	.95	.84	.91	.94	.90	.93	.91
Physical Effort.....	.81	.93	.82	.94	.86	.96	.70	.94	.94	.89	.64
Attention.....	.72	.88	.25	.77	.87	.66	.87	.69	.96	.77	.64
Working Conditions.....	.83	.85	.94	.94	.91	.92	.92	.96	.93	.90	.39
Median <i>r</i> (analyst).....	.81	.90	.82	.94	.91	.92	.91	.94	.93	.89	.91

\* The standard error of an  $r = 0$ , is .196. Applicable to each coefficient for each analyst on each factor.\*\* The standard error of an aver.  $r = 0$ , is .067. For average intercorrelation procedure see Peters and Van Voorhis, *Statistical procedures and their mathematical bases* (revised ed.), p. 197-201.

As a guide to action, it seems reasonable to conclude that the job information available and the understanding of the definitions were satisfactory for the factors "knowledge," "adaptability," and "working conditions." On the other hand, improvement could be sought in the remaining six factors.

This is borne out by an analysis of the range of ranks assigned each job for each factor. The average rank-range for "knowledge," "adaptability," and "working conditions" was 6.6 ranks, 7.7 ranks, and 8.6 ranks respectively. On the other hand, the average rank-range for "attention" was 15.4 ranks, for "physical skills" it was 11.5 ranks, and for "responsibility for materials" it was 11.4 ranks. The spread of rankings for a job on a factor provides a rough index of the consistency with which the job is rated on the factor.

*Consistency of Ratings of Jobs.* Paterson (6) has suggested that it is questionable whether all job evaluation factors are equally applicable to all jobs to which they are applied. In an effort to determine whether any of the factors were inapplicable to any jobs, or whether any of the jobs in the sample were particularly difficult to rank with respect to particular factors, the analysts were asked to report their reactions in this respect.

The analysts were uniformly of the opinion that all the factors were applicable to every job, if only to establish a point of the ranking continuum. For example, "responsibility for the work of others," which may be interpreted broadly as supervisory responsibility, was deemed applicable to clearly non-supervisory jobs. The factor provided a basis for making a skill level discrimination in this area. The same comment is applicable to any of the factors, on the proposition that absence of the factor from the job is itself pertinent to evaluation of the job.

With respect to the particular jobs included in the sample, however, the question of applicability frequently became one of adequacy of information. For four jobs the rank-range on each factor was wide. The analysts reported that these were jobs for which the information was too ambiguous or too scanty to make a ranking judgment with confidence. It was also found that, for particular jobs, personal biases of one kind or another operated in one or more of the factors. These led to interpretations at variance with the interpretations placed either on the job or the factor by the group as a whole. For example, should the Physician's performance of operations be ranked low on "working conditions"? To what extent is a worker responsible for the safety of others when he works in high places and may drop his tools on another worker?

The information collected served as a basis for reconsideration of factor definitions, and pointed to the need for trial runs to ensure that factor definitions adequately cover all variations of application of the factor.

*Factor Overlap.* In view of the small size of the sample and the deficiencies revealed in the data and the factor definitions, only a hasty study was made

TABLE 2. INTERCORRELATIONS AMONG NINE JOB EVALUATION FACTORS

Note: 27 jobs, correlations of median ranks of 10 analysts

of factor overlap. The correlation between each pair of median rankings was calculated. These correlations are given in Table 2.

It is obvious from Table 2 that the factors do not represent independent variables. In fact, some of them seem to be almost identical ("knowledge" and "adaptability").

### SUMMARY AND CONCLUSIONS

In a pilot study designed to determine the reliability of job evaluation ratings made by trained analysts, ten analysts ranked twenty-seven jobs on nine factors. The following conclusions seem justifiable:

1. That in general a high degree of reliability of analyst judgment may be anticipated.
2. That consistency of rating appears to be in part at least a function of the factor rated, and in part a function of the job information available. It would therefore seem desirable to determine analyst reliability for each factor independently, and to make adjustments accordingly.
3. That in a set of as many as nine factors it is probable that at least some of the factors overlap and may be dispensed with. However, it may be that the elimination of one of a pair of correlated factors will alter appreciably the interpretation of the remaining factor, which will absorb some of the implications of the deleted factor. It would seem desirable to discover whether the overall order of jobs does in fact remain the same when such eliminations are made.

The writer feels that certain qualifications of these results should be noted. In the first place, the reliability noted relates to the content of job descriptions; whether the rankings are valid for the jobs themselves remains to be determined. In the second place, the great variability of jobs in this sample, as compared with the array of jobs usually found in a single plant, probably tended to increase the reliability coefficients. Finally, since ranks were used in this study, rather than a longer point-rating continuum, a slight loss in comparability with the usual job evaluation plan has possibly resulted.

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## 5. A Factor Analysis of an Industrial Merit Rating Scale

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Reprinted from the *Journal of Applied Psychology*, 1941, 25, 481-486, by permission of the authors and of the American Psychological Association, Inc. Users of a merit rating scale which includes a number of traits usually assume that the scale separately indicates the merit or standing of the employee on each of the traits. The need for cautious interpretation of such scales is indicated by this study in which a factor analysis of a scale in use in one industrial plant revealed only two aspects of the employee's merit and not twelve as might be inferred from casual examination of the scale.

Industries using a merit rating scale which includes a number of traits usually assume that the scale separately indicates the merit or standing of the employee on each of the traits included. Thus if a scale includes items on job performance, safety, health, and so forth, it is assumed that the rating on each of these items represents a separate and specific trait of the employee.

The purpose of the present study has been to analyze statistically such a scale as it is now functioning in one industrial plant to determine the influence and significance of each trait on the final result.

One question which is often raised by persons preparing merit rating scales for use in industry is the number of traits which the scale should include. The present study has determined by statistical analysis whether

TABLE 1. INTERCORRELATIONS OF THE TRAITS IN A 12 ITEM MERIT RATING SCALE

1. Safety	..	..	..	..	..	..	..	..	..	..	..	..
2. Knowledge of job	.81	..	..	..	..	..	..	..	..	..	..	..
3. Versatility	.52	.81	..	..	..	..	..	..	..	..	..	..
4. Accuracy	.61	.52	.80	..	..	..	..	..	..	..	..	..
5. Productivity	.63	.85	.72	.81	..	..	..	..	..	..	..	..
6. Overall job performance	.55	.79	.72	.80	.67	..	..	..	..	..	..	..
7. Industriousness	.60	.82	.71	.80	.78	.80	..	..	..	..	..	..
8. Initiative	.49	.78	.71	.78	.78	.78	.80	..	..	..	..	..
9. Judgment	.54	.78	.78	.82	.84	.81	.81	.88	..	..	..	..
10. Cooperation	.62	.80	.82	.84	.74	.81	.81	.80	.72	..	..	..
11. Personality	.61	.67	.68	.74	.81	.81	.81	.80	.72	.75	..	..
12. Health	.55	.67	.63	.70	.73	.74	.74	.67	.72	.75	.43	.52
	.25	.52	.50	.84	.45	.45	.60	.53	.77	.43	.52	.71

one such scale, embracing twelve traits, is actually working in this particular instance as the constructors of the scale intended it should. In other words, the study has determined how many traits actually influence the ratings.

According to the scale in use in a large industrial plant, ratings were obtained on twelve traits, as follows:

1. Safety	7. Industriousness
2. Knowledge of job	8. Initiative
3. Versatility	9. Judgment
4. Accuracy	10. Cooperation
5. Productivity	11. Personality
6. Overall job performance	12. Health

Each trait was rated on a continuum which contained five "landmarks."

In most cases, each employee was rated by three supervisors and the average of the three taken as the merit rating of the employee. In some cases, where three supervisors were not in close contact with the employees, only two raters were used. In a still smaller number of cases, the ratings were made by only one supervisor.

Ratings were obtained on 1120 men, although for traits 11 and 12 only 1092 ratings were available. Tetrachoric intercorrelations were computed for all twelve traits. Inspection of the table of intercorrelations (Table 1) indicates that in general the correlations are high.

The correlation matrix was factor analyzed, using Thurstone's centroid method. Three factors were extracted, the extraction process being stopped with the third factor since Thurstone's "phi" test was satisfied at that point. Examination of the third factor residuals indicated that only one residual lay between .11 and .15, thirteen lay between .05 and .10 inclusive, and fifty-two were .05 or less.

The plots from the centroid matrix were rotated to the position of best fit. The factor loadings after rotation appear in Table 2. With the exception of item No. 4, simple structure was obtained.

Factor I, a general factor, accounts for most of the total variance of the scale considered as a whole. In view of the extremely high factor loadings on items 6, 5, and 7 (Overall job performance, Productivity, and Industriousness) and the high communalities of these items, this factor can well be termed "Ability to do the present job." It seems a safe generalization to state that ratings on this one factor or variable would be nearly as valuable in predicting worker competence as are ratings on all twelve traits.

Factor II, although less significant statistically than Factor I, is nevertheless of interest. In view of the size of the population used, the factor loadings on items 2, 3, and 4 (Knowledge of job, Versatility, and Accuracy) may be considered fairly significant. However, to name the factor represented by this configuration is more hazardous than the naming of the first factor

TABLE 2. FACTOR LOADINGS AFTER ROTATION

	Factor Loadings			$h^2 *$
	I	II	III	
1. Safety.....	.633	.245	-.039	.462
2. Knowledge of job.....	.841	.337	-.002	.821
3. Versatility.....	.795	.325	.030	.739
4. Accuracy.....	.826	.448	.297	.971
5. Productivity.....	.913	.039	-.042	.837
6. Overall job performance.....	.961	-.080	-.064	.934
7. Industriousness.....	.906	.009	.007	.821
8. Initiative.....	.887	.094	.252	.859
9. Judgment.....	.897	.265	-.036	.876
10. Cooperation.....	.881	-.025	.042	.779
11. Personality.....	.815	.009	.259	.731
12. Health.....	.573	-.016	.836	1.027

\* Communalities.

extracted. It is suggested, as a possibility, that this factor represents knowledge or skill possessed over and above the requirements for the specific job. The relatively low loadings on this factor may be accounted for by the fact that the "factor" objectively represented may be inadequately measured by the items in the present scale. At any rate, Factor II does not contribute to the predictive value of the present scale to any such degree as does Factor I.

Factor III contains only one significant loading, namely, in the variable "Health." Previous studies of the reliability of the ratings have indicated that health is rated with a reliability lower than the reliability of any other item on the scale. Thus the fact that Health stands out as a single factor can be accounted for by the relatively low average intercorrelations of the Health variable. Furthermore, the health of employees would seem to be indicated more accurately by company records or medical examination than by supervisors' ratings. This fact, coupled with the fact that Factor III is clearly an artifact due to the unreliability of the health ratings, justifies the disregarding of Factor III as a real characteristic of the employees rated.

It should be mentioned that Factors I and III are orthogonal, while Factors I and II are oblique. Thus Factor II, as measured by the present scale, is not independent of Factor I, the general factor.

This analysis indicates that for the scale and population considered, worker competency could be rated on one, or possibly two "traits," as well as it is now rated on the basis of twelve. This in no way contradicts the fact that

adequate training of raters might enable them to rate workers on more than two suggested traits, or that a modification of the scale might result, even without more training of the supervisors, in ratings which would validly indicate more than two employee traits. That is, if the raters were educated in the general use of rating scales, the avoidance of "halo," and given other training in the use of the specific scale in question, or if the items were changed so as to include traits not specifically covered by the present scale (such as skill apart from performance, or likelihood of promotion) it is quite possible that a scale of several items, applicable to the workers to be rated, could be made to function.

In this regard Stevens and Wonderlic<sup>1</sup> suggest the rating of all men on each trait before going on to other traits. Wadsworth<sup>2</sup> points out that supervisors must be educated to support their opinions with facts. Bingham's position that carefully focusing attention on each of several traits probably makes the total over-all rating more valid<sup>3</sup> would seem to be tenable only if the traits considered can be shown to be relatively discrete, and to be associated with the job in question.

A further argument for the use of merit rating scales covering a relatively small number of traits lies in the fact that with many traits, the same numerical score for the entire scale can result from a number of patterns of merits and demerits on the individual traits in the scale.<sup>4</sup>

#### SUMMARY

A factor analysis of the ratings of 1120 men on a twelve trait merit rating scale revealed only two factors. Factor I was termed "Ability to do the present job," and accounted for most of the variability of the ratings. Factor II, less significant statistically, possibly represents skill possessed over and above the requirements for the specific job. A third factor, with a significant loading only in the variable "Health," was accounted for by the unreliability of the health ratings themselves, and thus can be disregarded as an artifact.

The implications of the research for industry are that when a multiple item rating scale is adopted it is possible that the ratings will really reveal only one or two aspects of the employee's merit and not twelve or more aspects as might be inferred from casual examination of the scale.

<sup>1</sup> S. N. Stevens and E. F. Wonderlic, "An Effective Revision of the Rating Technique," *Personnel J.*, 13, 1934, 125-134.

<sup>2</sup> G. W. Wadsworth, "Practical Employee Ratings," *Personnel J.*, 1935, 13, 263-269.

<sup>3</sup> W. V. Bingham, "Halo, Invalid and Valid," *J. Appl. Psychol.*, 1939, 23, 221-228.

<sup>4</sup> G. W. Wadsworth, *op. cit.*

## 6. Time-study Methods Applied to Job Evaluation

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Reprinted from the *Journal of Consulting Psychology*, 1945, 9, 152-160, by permission of the author and of the American Psychological Association, Inc. The author contends that time-study and job evaluation are, in a sense, mirror images of each other and that the best way to advance job evaluation is to borrow from the more highly developed techniques of time-study. A "functional job-evaluation system" is described which consists essentially of the application of industrial engineering methods to what many companies think of as an industrial relations function.

"A fair day's pay for a fair day's work." This phrase illustrates how closely time study and job evaluation are linked, since time study measures the "work" side of the equation and job evaluation determines the "pay" side. Both are measuring devices useful to management and labor in decisions concerning wages and hours.

However, time-study techniques have progressed further than those of job evaluation, possibly because they deal with the direct quantitative measurement of tangible results—labor accomplishment. Job evaluation, on the other hand, must consider the subtle qualitative differences found in various occupations, and express these differences in such a way that they can be converted to dollars and cents.

Since these two subjects are, in a sense, mirror images of each other probably the best way to advance job evaluation methods is to borrow from the more highly developed techniques of time study. In other words, the wage administrator and job analyst should borrow ideas from the time-study man, examine each step in his procedure, and adapt it to his own problems. The "functional job-evaluation system" about to be described, is based on this similarity.

**Job Elements and Standard Data.** The time-study engineer considers each operation as a series of elements rather than as a single quantity. He has found that in order to analyze a complex operation you must break it down into small enough units so that each can be measured separately. He studies individually each element such as "Pick up part and place on table," instead of the whole series of such elements which make up an operation cycle. This leads to the development of standard time data in which each element is

measured carefully and accurately, making it unnecessary to re-study this same element every time it is encountered as a part of a subsequent operation.

The job analyst has not done this. He writes one job description after another, which contains many of the same basic elements or functions. Consider typical job descriptions for "Accounting Clerk," "Material Control Clerk," and "Material Release Man." They all include functions such as "post," "compile," "file," and "compute." It would have been far easier to set up standard data for job evaluation by considering each element separately. If each element were recorded in a standard paragraph, and this paragraph were given a title such as "copy," "schedule," etc., then each function could be evaluated by the regular evaluation methods of point rating, factor comparison and job (function) ranking.

Let's evaluate an imaginary occupation to be called "Material Control Clerk—'A.'" We find by investigation that the following elements are found in the work: "post," "compile," "file," "compute," and "reconcile." Since the functions will have already been described and evaluated, we have merely to combine the appropriate standard paragraphs to obtain the desired job description.

Converting function evaluations to an occupation's evaluation would consist of averaging the evaluation points assigned to each of its component functions according to the percentage of time spent performing each function. (See Table I.)

(Although only non-productive occupations are discussed, this functional system should be equally applicable to factory work.)

TABLE I. MATERIAL CONTROL CLERK—"A"

(All numbers are imaginary)

Element	Evaluation of Element	Per Cent Time Spent Performing Element	Extension
Post—"A".....	212	20	42.4
Compile—"A"....	315	10	31.5
File—"A".....	190	30	57.0
Compute—"A"...	286	30	85.8
Reconcile—"A"...	317	10	31.7
<b>Total.....</b>			<b>248.4</b>

Evaluation of Occupation: 248

**Variable Elements.** In carrying the analogy further, we find that the time-study engineer makes use of constant and variable elements. Our functional system also has this problem. The element "file" is undoubtedly a constant, since variations in the procedure of filing are extremely narrow. The element "analyze" is a different case. We might consider the "analysis" required of an aerodynamics engineer, and compare it with the "analysis" performed by an engineering clerk. There is a vast difference between them. Here is a variable which can be handled by describing and evaluating different grades of this element. This would give us the function "analyze—A," "analyze—B" and as many more grades as are needed.

Typical basic functions of technical, clerical and engineering occupations:

Analyze	Investigate
Audit	Plan
Compile	Procure
Disburse	Receive
Expedite	Reconcile
File	Schedule

Here is a possible description of the function "audit—B."

*Audit—B:* Check and verify coding, figures, calculations and postings of various transactions, documents or records, correcting minor or obvious errors, indicating errors or omissions; contact source of document for correction of errors, listing of errors to be adjusted, reconciling account entries, tracing and investigating discrepancies in documents or records reflecting the same transactions, and making adjusting entries in records or preparing adjusting documents according to prescribed procedures. This may involve work with accounting, material control, shipping, purchasing, inventory, cost and timekeeping documents, lists or records.

As new descriptions are requested the occupations can be analyzed as to their functions, and a new job can be built by a new combination of elements. If a new function or new grade of a standard function is found, this too can be written, evaluated, and included as a standard function. Standard paragraphs should include many examples prefaced by the words "such as," and as new examples are found, the functional paragraphs can be amended or enlarged.

**Job Description.** A standard job description form, as shown in Table II, indicates how the functional system can be adapted for use in the personnel administration of hiring, placement, up-grading, job rotation and merit rating. Besides showing the component functions of an occupation, the description shows a summary sentence and a summary paragraph. This paragraph is necessary to give the details of this particular job as it is actually performed in this specific company, which a mere list of functional paragraphs for evaluation could not do. (See Table II.)

TABLE II. STANDARD FORM FOR FUNCTIONAL JOB DESCRIPTION

Occupation Title:	Material Control Clerk "A"
Job Summary:	(Brief one sentence outline of the general purpose of the job.)
Work Performed:	
Paragraph One:	(Details of job summary to give a quick picture of the job, plus the main duties. The material should reflect this particular job as actually performed, but should not be used for evaluation. It could include any additional information to aid in quick differentiation of this job grade from other grades of the same job.)
Paragraph Two:	Post—"A" (Standard paragraph)
Paragraph Three:	Compile—"A" (Standard paragraph)
Paragraph Four:	File—"A" (Standard paragraph)
Paragraph Five:	Compute—"A" (Standard paragraph)
Paragraph Six:	Reconcile—"A" (Standard paragraph)
Paragraph Seven:	(Knowledge requirements)

**Differentiation between Job Grades.** One of the weakest spots in the present system of job classification is the differentiation between various grades of an occupation. This is particularly true when composite industry-wide descriptions are being applied. The most commonly used wage structure is the "step" type, in which the jobs are divided into labor grades according to point evaluation, and a rate range applied to each grade. The rate ranges usually extend from 5 per cent to 25 or 30 per cent above their respective minimum rates. For example, the lowest labor grade in a structure might be \$.75-.80 an hour and the highest might be \$1.35-\$1.65 an hour.

This works well for most occupations, but there are some, possibly 10 per cent or more, which do not fit into this system well. Let us consider the job of a Dispatcher. The minimum dispatching function may evaluate to fall in a labor grade with a range of \$.75-.80 an hour. However, an evaluation of top grade dispatching may fall into a rate range of \$1.00-\$1.15 an hour. Yet this difference cannot be shown by a description of the duties and responsibilities of the two jobs. They differ in degree only—not in actual duties. To fit this situation a synthetic "A," "B," and "C" grade of the occupation "Dispatcher" must be written in order to have a classification for employees who progress from \$.75 up to \$1.15 an hour. These synthetic job grades lack true differentiation, are difficult to apply, and are open to varying interpretations.

The functional system could handle this problem satisfactorily because it would be possible to recognize not only differences in kinds of duties, but in degrees of difficulty of similar duties. There would be three methods of grade differentiation:

1. Allocation of different percentages of time spent performing each function.
2. Combination of different grades of the same functions.
3. Combination of different functions. (See Table III.)

Under the functional system the job descriptions are created by combining smaller units (job elements). This is really "job synthesis" and not "job analysis" at all. It will be far easier to build a job description by merely choosing the appropriate standard paragraphs and combining them, and will require less analytical ability than the present method.

TABLE III. GRADE DIFFERENTIATION BETWEEN "A," "B" AND "C" JOB GRADES, SHOWING HOW FUNCTIONAL SYSTEM RECOGNIZES DIFFERENCES IN DEGREE, WHERE DUTIES MERELY VARY IN DEGREE OF DIFFICULTY

General Clerk

(All numbers are imaginary)

Job Elements or Functions	Per Cent of Time Spent Performing Element		
	Grades		
	"A"	"B"	"C"
Check.....	25	15	5
Compile.....	20	15	5
Compute.....	25	15	5
Copy.....	15	15	15
Distribute.....	5	10	20
File.....	5	15	25
Sort.....	5	15	25

Today's method of point evaluation by use of an evaluation plan has a serious weakness. Let us consider an evaluation plan containing the factors shown in Table IV, one of which is "initiative." In choosing the proper degree of a factor to assign to a job, different job analysts consider different functions that make up the job. One analyst might quote the second paragraph of a description to substantiate his statement that the whole job should be assigned the 3rd degree of "initiative." Another analyst might choose Paragraph 5 of the same description and claim that the 2nd degree of "initiative"

TABLE IV. MATERIAL CONTROL CLERK—A

Diagram shows how present method of job evaluation results in certain functions being evaluated as if they represented the whole job for that particular factor

Factors or Characteristics of a Typical Evaluation Plan	Element or Function				
	Post	Compile	File	Compute	Recompile
Mentality.....				x	x
Analytical Requirements.....				x	
Initiative.....		x			x
Cooperation and Contact.....			x		
Decisions Affecting Cost.....				x	
Dependability and Accuracy.....	x				
Mental Application.....	x				
Physical.....			x		
Job Conditions.....			x		
Training and Experience.....					x

was the correct choice. Then the argument would develop into determining whether the average employee doing this job spent a larger portion of his time performing the duties of Paragraph 2 or Paragraph 5. Suppose that it was finally decided that the 3rd degree of "initiative" was correct because the average employee spent 20 per cent of his time performing the duties of Paragraph 2 while only spending 10 per cent of his time performing the duties in Paragraph 5. The net result would be the assignment of the 3rd degree of "initiative" for the whole job when the basis for assigning this degree only consisted of 20 per cent of the employee's time. Possibly the other 80 per cent of the time was spent on functions requiring only the 1st degree of "initiative."

It is understandable why there are disagreements in job evaluation when a whole job is evaluated on the basis of tying each factor to the most convenient function, often chosen at random. The results depend upon which function is considered, as well as upon the proportion of time spent performing each function.

Turning to Table IV again we can see how incorrectly "Material Control Clerk—A" could be evaluated. The scatter diagram shows the functions which would probably be incorrectly used to represent the whole job under the present method. This will usually lead to over-evaluation of jobs since (as in Table IV) an analyst certainly wouldn't consider the "mentality" for "file" or "post" when the job also required "reconcile."

Compare the above procedure with that proposed in the functional system.

**Advantages. Industry-wide Wage Stabilization.** An examination of many varied industries has revealed that most of the supposedly similar non-productive occupations vary greatly in duties and responsibilities, even when they carry identical titles.

The present system of job classification offers two methods to cope with this situation encountered in an industry-wide wage stabilization program.

1. Write composite industry-wide job descriptions which are worded in general terms so that all the variations encountered in each company will be covered. There are three main difficulties in this method.
  - a. The jobs are so broad in scope that they are difficult to evaluate.
  - b. Employees performing only part of the duties of a highly paid occupation can legitimately claim that, since the description is meant to give only a general over-all picture of the job, performance of any part of it constitutes qualification for this classification, even if this part is only incidental to the main purpose of its function.
  - c. Broadly worded job descriptions make differentiation between grades of any one job extremely difficult.

These problems lead to different interpretations by each company within the industry, which is undesirable.

2. There is another choice under the present method. This consists of writing a "tight" specific job description for each variation of the same job. This, too, has disadvantages which are:
  - a. There will be too many job classifications.
  - b. A great many descriptions will overlap.

Here again the door is wide open for a separate interpretation by each plant.

Both of the above approaches lead to a defeat of the purpose of wage stabilization—"equal pay for equal work," since they allow different interpretations by each company.

The proposed functional system would permit an industry-wide stabilization of job elements or functions (instead of whole jobs) by a standardization of their relative evaluations. Its flexibility would permit each company to combine the functions in such a way that they would reflect the actual conditions peculiar to the occupations as they exist in each plant.

**Union Representation.** In many companies, union representatives participate as members of a committee in evaluating the occupations of the employees they represent. Through the use of the grievance procedure, the unions actually participate in wage administration as well. It is only human nature for employees to desire a job classification with the highest rate of pay, and a union, as the representative for these employees, reflects this desire. Broadly written job descriptions, overlapping job descriptions, and poor differentiation between job grades are practically invitations for em-

ployee grievances. If each job and grade were defined clearly and evaluated by a method that was indisputably defendable, many questions of classification could be settled on a factual basis without involving the interpretation of words, the intended implications of a phrase, or the one man's judgment against that of another. The functional system would simplify those phases of labor relations which involve job classification, and are the real test of a wage structure.

*Personnel Administration.* Job classifications and descriptions have many other applications besides job evaluation. Any method of presenting these descriptions which would break a job down into its functions would give the personnel department a better tool with which to work in hiring, placement, transfer of skills for job rotation, and up-grading. A merit system could be created to tie in closely with the functional system of job evaluation. In other words, an employee could be rated on his performance of each function of the job, rather than on its several phases grouped as a whole.

*Methods Studies.* Another application of job descriptions and classifications is in analyzing work performed to eliminate "bottle-necks," standardize procedures and avoid duplications of effort by organization control. The only way in which systems analyses can be made is to find out what is being done at present, and by whom. It would be a duplication of effort to analyze employees' work once for wage determination, and to do it all over again for organization control. Since the functions to be performed by each division and unit of an organization usually determine their structure and procedure, functional job descriptions would enable the methods analyst to find out who performs what duties.

*Evaluation Plan.* A job evaluation plan develops through slow and painful stages of growth. It evolves through a "roughing-in" or trial and error process, requiring continual tests to verify its validity. One difficulty in present point methods of evaluation is encountered when one attempts to tie a given degree of a factor in a plan to a given job. Consider the factor "analytical ability." If it is divided into 3, 4, or 5 degrees, it is very difficult to word these degrees for clear differentiation (the same way in which it is difficult to distinguish between job grades).

The functional system can act as an ideal way to check the validity of any given job evaluation plan. This will come about when factor comparison and job (function) ranking are applied to the point ratings assigned to various functions. Eventually each degree of a function can be sprinkled so liberally with specific examples that evaluation controversies should be greatly reduced.

The proposed functional system of job evaluation is really only a transition stage between the present practice and an even more advanced system in which the job functions or elements would themselves become the various degrees of the factors in an evaluation plan containing twenty, thirty or more factors.

**Disadvantages.** Like any change in a basic idea, this proposal cannot be used until a great deal of work has been done. First, the basic functions or elements must be defined and grades of functions must be established. This in itself will be a difficult task.

Fifty or more years ago, when frying pans were made by handbeating a piece of sheet iron over a crude form, someone probably suggested that a better tool be constructed in which a flat sheet of metal would be placed between a cup and a plunger, to permit forming with one stroke. He was probably answered by objections which emphasized the difficulties of making such a tool, its cost, and the precision required. Someone might have said, "While you were making this tool I could turn out 100 frying pans by hand." In spite of this type of thinking, tooling is now one of the foundations of mass production. Besides this, each part produced by the tool bears its small share of the original cost.

The functional system is merely the process of "tooling-up" job evaluation for high production, instead of hand tailoring each job description. That is exactly what standard time-data have done for time study. It may be argued that there is no need for "high production" tooling, when only a few score job descriptions are needed in any one plant. This can be refuted by showing that once enough functions are described and evaluated, they can be used in any industry from Portland, Oregon to Portland, Maine. For example, the maintenance carpenter in an aircraft plant performs some of the same functions as the maintenance carpenter in a soy bean grinding mill, an aluminum factory, a fish cannery or a laundry.

It is conceivable that nation-wide stabilization of job functions can be established. This program probably could not be pioneered by any one company; it would require the efforts of an industry, a trade association or the federal government.

*Post War Applications.* When industry is back on a competitive basis, and cost, rather than volume of production, returns as the prime factor, wage rates will become an even greater source of controversy. Some managements will take the view that job analysis, job evaluation and wage stabilization are unnecessary; that you merely pay employees just enough to keep them working and no more; their position will be that rough justice is maintained by the law of supply and demand.

A short-sighted management soon breeds an equally short-sighted union. An unbalanced rate structure merely serves to place a tool in the hands of an aggressive union whose representatives can capitalize on the wage inequalities and inconsistencies. When an orderly rate structure is finally forced through, the very fact that labor had to take the initiative, puts management on the defensive. The union enthusiasm and pressure that has been generated through what was originally a just grievance (inequalities in pay) can easily be diverted to raising the whole level of wages above normal. If, on the other

hand, management had made efforts to put its house in order before "the heat was turned on," they could have arrived at a fair and balanced rate structure by themselves, and at a proper level.

*Labor Cost Control.* Labor utilization has recently gained a great deal of attention because of the shortage of skilled workers. Under peacetime conditions, it will be equally important, but for a different reason—labor cost.

Let us examine the jobs of several employees classified as "A" or senior-grade Tool Planners. We find that one third of each man's time is spent doing clerical work, yet since the majority of their time is spent performing Tool Planning work, they must be paid as such. The company employing these men loses the difference between a clerical pay rate and a Tool Planner's pay, for one third of their time. Of course such a condition would ordinarily result in a review and reassignment of the work to use the employees' abilities to full capacity. If, however, this "split-function" job cannot be changed for some reason, the man will continue to be over-paid.

The functional system would solve this problem quite easily by combining the proper functions to reflect this work and allocating the correct average of the functions' evaluations according to the proportion of time spent performing each. Thus the functional system would pay employees for what they actually do, not for what they can do, but are required to do for only a part of their time. It would also prevent excessive payments for "stand-by" skills.

Let us suppose that a job has been simplified through better tooling, material changes or methods studies. It is logical to assume that men on this work should be transferred, and less skilled men be brought in (rather than reducing the rates of the men who have been on the job). A new job description and rate range may be requested. This takes time to study under the present system, but under the functional system, a new combination of functions can easily be made which will reflect actual conditions almost immediately.

Better differentiation between grades of an occupation under the functional system prevent the common occurrence of an unqualified employee (as mentioned above) claiming a higher classification on the ground that he fills part of a loosely-worded job description.

*Cost of Wage Administration.* The cost of any job analysis or wage administration program is an important consideration. The functional system, once the original studies are made, will take a lot of the "art" out of job analysis and reduce it to a technique. It will require fewer skilled analysts, and much of the work, once it is set up, can be handled by clerical help. Here is work simplification applied to wage administration. The same number of people could handle a much greater volume of work alone since it would be standardized and "tooled-up." No new job descriptions would be written or evaluated; there would merely be different combinations of functions. Occasionally, a new function or a new grade of an already established

function would be required. This would be the work of a qualified job analyst. New combinations of functions could be handled by questionnaires and tied in with a book of standard functions.

The amount of employee, supervisory, and executive time consumed in deciding upon, interpreting, and adjusting grievances related to job classifications is enormous. Any method to substantially decrease the expenditure of this non-productive effort would decrease the cost of the company's product under peacetime competitive conditions. The functional system would clarify jobs and job grades which blend into each other. This lack of clear differentiation is probably the greatest source of discussion and grievance in companies whose employees are represented by a union.

A wage structure must be very sturdily built these days to withstand the three-way buffeting it receives from union, management and governmental agencies. Job evaluation, the tool used to establish many wage structures, is now itself the battleground in wage stabilization controversies. The delicate balance established between the relative worth of different jobs must be indisputably defendable against criticism. If present methods are found to be inadequate, we should not attempt to defend them but should be ready to take a fresh look at the fundamentals and start over again if necessary.

The functional system is more flexible and adaptable than the static methods now used. It is essentially the application of industrial engineering methods to what many companies think of as an industrial relations function. Many union-management controversies over the application of job descriptions arise because today's rapidly changing conditions cannot be met by a system which was designed as a stationary structure, and which is thrown out of balance by each modification. The functional system is more versatile in that it is fluid enough to reflect the varied and changing conditions of today, as well as the new peacetime conditions of tomorrow.

## 7. Forced Choice—The New Army Rating<sup>1</sup>

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*E. Donald Sisson*

Reprinted from *Personnel Psychology*, 1948, 1, 365-381, by permission of Personnel Psychology, Inc. Although the data used in this study deal with the rating of military personnel, the technique as described is clearly applicable to a wide variety of personnel situations including the rating of industrial personnel.

The origin of the use of efficiency reports for Officers of the U.S. Army is lost in history, as is the story of the evolution of the formal procedures of reporting. Sometime after the first World War, however, a standard form was adopted and a procedure regularized for accomplishing this report. Thereafter, twice each year—on June 30th and on December 31st—every officer in the Army has been rated by his immediate superior, and this rating submitted to the War Department. Though early recognized as not completely satisfactory, the original rating form remained in force (with sporadic minor amendments) until it was superseded in July of 1947.

The new form is the product of many months of concentrated research. It is radically different in many respects from the old form, and from other rating devices currently in use in industry. Its most novel feature is the use of what has been called the "forced-choice" rating method. Rather than indicating how much or how little of each characteristic an officer possesses, the rater is required to choose, from several sets of four adjectives or phrases, which best characterizes the officer, and which is least descriptive. In other words, it calls for objective reporting and minimizes subjective judgment. And because of the way in which the tetrads—sets of four rating elements—are constructed, it reduces the rater's ability to produce any desired outcome by the choice of obviously good or obviously bad traits. It thus diminishes the effects of favoritism and personal bias.

The technique, and the form embodying it, has been tried out on fifty thousand officers—in both experimental and official trials—and the results obtained with it have been compared with independent criteria of efficiency arrived at through group ratings. The new method is superior to all other

<sup>1</sup> The research reported in this study represents the combined efforts of the entire professional staff of the Personnel Research Section, AGO in 1945. The opinions expressed, however, are those of the author and do not necessarily represent those of the Department of the Army.

methods examined. It produces a better distribution of ratings relatively free from the usual pile-up at the top of the scale. It is less subject to influence by the rank of the officer being rated. It is quickly and objectively scored by machine. And above all, it produces ratings which are more valid indices of real worth.

The particular form developed for rating Army officers would probably be of little value for other groups—largely because of the specificity of the rating elements it contains. The technique, however, has already proved of value in other situations and there is every reason to believe that it is even more generally applicable.

**The Old Rating System.** It can generally be assumed that the main value of efficiency ratings—usually their sole purpose—is in providing a sound basis for personnel actions. Yet when the clouds of war rolled up in 1940 and it became evident that the Army needed to promote a rather large number of top-ranking officers immediately to serve as generals of the rapidly mobilizing forces, it was suddenly discovered that the years of regular efficiency reporting had provided no basis for the important decisions that had to be made. To quote one of the men responsible for making the selections at that time: "Efficiency reports, instead of showing the 150 best, showed only that of 4000 ground officers of suitable general officer age, 2000 were superior and best. As such a showing was perfectly worthless for the purpose, the selecting authorities reluctantly fell back on personal knowledge, which is exactly what the Army thought it was getting away from when, twenty years ago, it inaugurated the existing system."<sup>1a</sup>

The existing system was not as bad as this recital might make it appear. As such systems go, in fact, it was fairly typical and quite respectable; it would even compare rather favorably with the run-of-the-mill of systems currently in use in business and industry. It contained some ten numerical scales covering such general traits as "force," "leadership," "attention to duty," "ability to obtain results," and so forth; and each scale, as well as the net numerical score, was divided into areas which were assigned the five adjectival ratings of superior, excellent, very satisfactory, satisfactory and unsatisfactory. It was generally filled out with great care, and undoubtedly with great seriousness—nothing is more important to the Army officer than his efficiency index. Moreover, its validity as determined through extensive tests was shown to be at least fair, particularly with respect to the identification of a very small number of outstandingly poor officers.

If a superior officer really and honestly wanted to point up the deficiencies in a truly poor subordinate, the form was adequate to the purpose. But therein lay its greatest weakness; the rater could control the outcome at will. And

<sup>1a</sup> Details of the comparative validity of a number of rating systems will be published in the near future.

because of traditions, the pressures of circumstances and for a host of other reasons—personal or general—he usually made it come out high. He said only the best of his men or else “damned with faint praise” by saying the next best about those whose performance was low. Or if his conscience pricked, he said nothing, and left the trait unrated with a cryptic “unknown.” “Nothing but good” was the general rule, with the consequence that the whole scale was distorted; what was supposed to be outstanding became typical; and to be labelled “satisfactory” was to be called intolerably inefficient. To correct these deficiencies in the system, and to provide a more valid procedure for rating Army officers, work was begun in 1945 on the development of a new efficiency report.

**The New Officer Efficiency Report.** At the outset the research leaned pretty heavily on the finding of a recently completed program for screening wartime officers to be offered commissions in the Regular Army. One of the instruments developed in that program—and shown to possess a high degree of validity—was a rating form which incorporated, among other elements, a forced-choice section. In addition, a by-product of the earlier research program—a method for constructing an acceptable criterion—was of equal importance to the present problem. This latter will be discussed first.

*The Criterion.* The crucial importance of the criterion in research of this kind cannot be over-emphasized. To determine the validity of any rating system, it is obviously necessary to compare ratings produced by it with some independent measure of each man’s “true” merit. In this case, the criterion problem was attacked by identifying groups of officers who were clearly outstanding in efficiency or competence and other groups clearly less competent. This identification, of course, could not be based on existing efficiency reports since to do so would beg the whole question. Nor could it be based solely on other such opinions of superiors. It was decided, therefore, to use the consensus of fellow-officers in identifying the Army’s best and poorest. The procedure followed was somewhat as follows. Officers belonging to the same unit, and in a position to know each other’s work and qualifications, were assembled in groups of about twelve to forty. Each was furnished a form on which all names appeared in alphabetical order, regardless of rank. Without signing the form, or identifying himself in any way, each officer was asked to select the best—most competent—of the group, then the least competent, and to continue selecting most and least competent until all but about five names on the list had been selected as among the most or least competent. By tallying these nominations, it was possible to earmark the two or three in each group who were clearly best, the two or three clearly poorest, and finally, from among the names not rated either high or low, some truly average officers. By repeating the process in literally hundreds of such units, comprising almost 50,000 officers, rather sizable groups of high, middle, and low officers were identified.

Members of these three widely divergent criterion groups were rated in the normal manner on various types of rating forms. Needless to say, no rating officer was apprised of the criterion status of the ratee. Results obtained with these independent ratings were correlated with criterion-group membership. In all comparisons, one particular form stood out as most valid. This was the form containing the forced-choice elements mentioned above.

*How Forced-choice Items Are Made.* Forced-choice rating elements are sets of four phrases or adjectives pertaining to job proficiency or personal qualifications. The rater indicates which of the four is most characteristic of the ratee, and which is least characteristic; and repeats this selection for each of the sets included. A sample set is the following:

- A. Commands respect by his actions.
- B. Coolheaded.
- C. Indifferent.
- D. Overbearing.

It is at once obvious that two of these are relatively favorable terms, and the other two relatively unfavorable. One of the two favorable terms, checked as most characteristic, gives plus credit; selecting the other, gives no credit. In the same way, picking one of the two unfavorable items as least characteristic adds credit whereas the other adds nothing.

The construction of these tetrads and the determination of the scoring key are the crucial problems in the development of a rating scale of this type. Rundquist (2) outlined six steps in the process.

1. Collection of brief essay descriptions of successful and unsuccessful officers.
2. Preparation of a complete list of descriptive phrases or adjectives culled from these essays, and the administration of this list to a representative group of officers.
3. Determination of two indices for each descriptive phrase or adjective—a preference index and a discrimination index.
4. Selecting pairs of phrases or adjectives such that they appear of equal value to the rater (preference index) but differ in their significance for success as an officer (discrimination index).
5. Assembling of pairs so selected into tetrads.
6. Item selection against an external criterion and cross-validation of the selected items.

The New Officer Efficiency Report, as it was approved for official use, consists of twelve of these forced-choice tetrads relating to job proficiency, followed by two ten-point graphic scales concerning the ratee's primary and secondary duties (Fig. 1). Then there are twelve more tetrads pertaining to personal qualifications, followed this time by six ten-point scales concerning such general characteristics as co-operation—spelled out as "The degree to which he is able and willing to work with other officers and enlisted men"—or initiative, the "degree to which he is able to act on his own responsibility

in the absence of orders." (Fig. 2). These sections, which constitute the scorable part of the form, are printed on an IBM answer sheet. Preceding

<b>EFFICIENCY REPORT</b> WD AGO Form 67-1 Part 2      See AR 600-185 for details.								Unit Adjutant or Personnel Officer will complete Sections I and III. Rating Officer will complete Sections II, IV, V, VI, VII, VIII, and IX. Indorsing Officer will complete Sections II, V, VII, and IX.																					
<b>Section III. OFFICER REPORTED UPON</b> <small>Enter same information as for Section I.</small>																													
LAST NAME		FIRST NAME		INITIAL	SERIAL NUMBER	GRADE	ARM OR SERVICE	COMPONENT	PERIOD OF REPORT		DO NOT WRITE IN THIS SPACE																		
									FROM	TO																			
THEATER OR CONTINENTAL COMMAND		UNIT, ORGANIZATION, AND STATION				PRIMARY MOS	DUTY ASSIGNMENT (MOS CODE)	DAYS OF			JP																		
								DUTY	LEAVE	OTHER NON-DUTY																			
DATE OF REPORT		FOR REPORTS RENDERED BECAUSE OF PERMANENT CHANGE OF STATION, SUPPLY ADDRESS OF UNIT AND INSTALLATION WHERE OFFICER WILL REPORT										PQ																	
												OA																	
READ INSTRUCTION SHEET CAREFULLY BEFORE MARKING THIS SECTION																													
<b>Section IV. JOB PROFICIENCY</b>																													
A. Becomes dogmatic about his authority. B. Careless & slipshod in attention to duty. C. No one ever doubts his ability. D. Well-grounded in all phases of Army life.				A. Always criticizes, never praises. B. Carries out orders by "passing the buck." C. Knows his job and performs it well. D. Plays no favorites.				A. Fails to work for the best interest of all. B. Has a high degree of initiative. C. Never makes excuses for his mistakes. D. Slow in accomplishing his work.				A. Fails to support fellow officers. B. Oversteps his authority. C. Gives clear and concise directions. D. Very exacting in all details.																	
A. Follows closely directions of higher echelons. B. Inclined to "gold-brick." C. Criticizes unnecessarily. D. Willing to accept responsibility.				A. Constantly striving for new knowledge and ideas. B. Businesslike. C. Apparently not physically fit. D. Fails to use good judgment.				A. Criticizes policies of superiors. B. Others can't work with him. C. If he is wrong, will admit it. D. The men know they can rely on his judgment.				A. Blames others for his mistakes. B. Always demands strict discipline. C. Excellent at constructive criticism. D. Hesitant about rendering decisions.																	
A. A go-getter who always does a good job. B. Cool under all circumstances. C. Doesn't listen to suggestions. D. Drives instead of leads.				A. Cannot assume responsibility. B. Knows how and when to delegate authority. C. Offers suggestions. D. Too easily changes his ideas.				A. Doesn't try to "pull rank." B. Knows men, their capabilities & limitations. C. Low efficiency. D. Uses a steady monotone in his speech.				A. Can take over in an emergency. B. Fair and just in his dealings. C. Lacks interest in his job. D. Questions orders from superiors.																	
READ INSTRUCTION SHEET CAREFULLY BEFORE MARKING THIS SECTION																													
<b>Section V. JOB PROFICIENCY</b>																													
DO NOT WRITE IN THIS SPACE				1 Management and operation of military matters not included in tactics and strategy.				5 Assisting commanders of battalions or larger units in devising methods of meeting the requirements of military situations.																					
				2 The direction of the over-all operation of a military unit.				6 Duties involving aeronautical skills performed by rated officers.																					
				3 Presenting learning materials in a classroom situation in a military or civilian component.				7 Training at service schools, Air University, Army Industrial College, etc.																					
				4 Exercise of specialized knowledge, requiring lengthy technological training.																									
<b>FOR RATING OFFICER</b>								<b>FOR INDORSING OFFICER</b>																					
PRIMARY		1	2	3	4	5	6	7	8	9	10	PRIMARY		1	2	3	4	5	6	7	8	9	10						
SECONDARY		1	2	3	4	5	6	7	8	9	10	SECONDARY		1	2	3	4	5	6	7	8	9	10						
DO NOT WRITE IN THIS SPACE		1	2	3	4	5	6	7	8	9	10			17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

FIG. 1. Job proficiency section of the New Officer Efficiency Report.

this, and attached to it but perforated to permit easy detachment, is a sheet calling for identifying information, a verbal description, recommendations and other information of an administrative nature (Fig. 3).

*The "For Keeps" Trial.* As already indicated, various preliminary forms of this report were tried out experimentally, validated against the criterion de-

scribed above, and compared with other types of reports. In all of these experiments involving the experimental rating of almost 50,000 officers the new

Section VI. PERSONAL QUALIFICATIONS															
Use ELECTROGRAPHIC PENCIL, following same directions as for Section IV. Make ONE mark in EACH column for each set of items.															
A. People work for & with him because of his personality.	B. Never rank-conscious.	C. Thinks only of himself.	D. Worries a great deal.	A. Lacks ability to inspire confidence of men & officers.	B. Easygoing.	C. Type of man everyone likes for a friend.	D. Has a quiet, dignified bearing.	A. Plenty of military snap, bearing, & neatness.	B. Normally cheerful.	C. Can't take criticism.	D. Doesn't get along with people.				
1	2	3	4	5	6	7	8	9	10	11	12				
A. Active in athletics.	B. Firm but not overbearing.	C. Egotistical.	D. Rubs people the wrong way.	A. Hot-tempered.	B. Fails to demonstrate originality.	C. Reserved.	D. Impresses people favorably.	A. Modest & reserved.	B. Doesn't have drive or force he should.	C. Antisocial.	D. Respected by all fellow officers.	A. Coolheaded.	B. Commands respect by his actions.	C. Overbearing.	D. Indifferent.
1	2	3	4	5	6	7	8	9	10	11	12				
A. Compliments a man on his good work.	B. Loses his head, gets excited.	C. Has admiration of officers & men alike.	D. Poor in dress & appearance.	A. Boastful.	B. Inspires pride in the organization.	C. Lacks tact.	D. Thoughtful of others.	A. A quiet, unassuming officer.	B. Follows rather than leads.	C. Has an attitude of superiority.	D. Tactful.	A. Immature.	B. Modest but not retiring.	C. Nervous.	D. Thoroughly cooperative in his work.
1	2	3	4	5	6	7	8	9	10	11	12				

Section VII. PERSONAL QUALIFICATIONS																					
Use ELECTROGRAPHIC PENCIL, following same directions as for Section V. MARK ALL SIX QUALIFICATIONS.																					
FOR RATING OFFICER		FOR INDORSING OFFICER																			
1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10		
The degree to which he is able to meet situations without bias and without emotional upset.																					
The degree to which he is able and willing to work with other officers and enlisted men.																					
The degree to which he is able to act on his own responsibility in absence of orders.																					
The degree to which he is able to discriminate & evaluate facts to arrive at logical conclusions.																					
The degree to which his appearance and behavior cause people to react favorably.																					
The degree to which he is able to carry out orders with consistency & firmness to achieve objectives.																					

Section VIII. OVER-ALL RELATIVE RANK FOR RATER ONLY											
The number of officers in this grade rated by me at this time is _____	If these officers were arranged in order, considering over-all future usefulness to the Army, from highest (No. 1) to poorest, this officer would be No. _____ of the total group rated.										

Section IX. AUTHENTICATION											
Use typewriter (except for signatures) or ink.											
I certify that I have read the current AR 600-185 and that all ratings are made in accordance with instructions contained therein, and that to the best of my knowledge and belief all entries contained hereon are true and impartial.											
SIGNATURE OF RATING OFFICER						SIGNATURE OF INDORSING OFFICER					
NAME, GRADE, AND ORGANIZATION OR UNIT						NAME, GRADE, AND ORGANIZATION OR UNIT					
OFFICIAL STATUS OF RATED OFFICER WITH RESPECT TO RATING OFFICER						OFFICIAL STATUS OF RATED OFFICER WITH RESPECT TO INDORSING OFFICER					

FIG. 2. Personal qualifications section of the New Officer Efficiency Report.

report proved more valid and more acceptable in several other respects. But since these were experimental trials, in which the pressures and circumstances surrounding official reports were not called into play, it was recommended that a real test be made in an official reporting period. Consequently, both the old form (known as Form 67) and a later version of the new report (to

be labelled Form 67-1) were used on all officers throughout the country for the regular semi-annual efficiency report in June 1946. At the same time, but

<b>EFFICIENCY REPORT</b>							Unit Adjutant or Personnel Officer will complete Sections I and III. Rating Officer will complete Sections II, IV, V, VI, VII, VIII, and IX. Indorsing Officer will complete Sections II, V, VII, and IX.					
See AR 600-185 for details.												
<b>Section I. OFFICER REPORTED UPON</b>												
Use typewriter or print in ink. Use carbon paper to fill out Section III at same time. See AR 600-185.												
LAST NAME	FIRST NAME	INITIAL	SERIAL NUMBER	GRADE	ARM OR SERVICE	COMPONENT	PERIOD OF REPORT		DO NOT WRITE IN THIS SPACE			
						FROM		TO				
THEATER OR CONTINENTAL COMMAND		UNIT, ORGANIZATION, AND STATION		PRIMARY MOS		DUTY ASSIGNMENT (MOS CODE)		DAYS OF			JP	
								DUTY	LEAVE	OTHER NON-DUTY		
DATE OF REPORT		FOR REPORTS RENDERED BECAUSE OF PERMANENT CHANGE OF STATION, SUPPLY ADDRESS OF UNIT AND INSTALLATION WHERE OFFICER WILL REPORT										PQ
NAME, GRADE, AND ORGANIZATION OR UNIT OF RATING OFFICER				NAME, GRADE, AND ORGANIZATION OR UNIT OF INDORSING OFFICER								OA
<b>Section II. DATA AND SUGGESTIONS FOR USE IN ASSIGNMENT</b>												
NOTE: Information on this page will be forwarded to the Career Branch of the Personnel and Administration Division by TAG after ratings have been determined. Proper future assignment and utilization of the officer will depend upon the care with which information in this section is formulated and reported. Use typewriter or print in ink.												
<p><b>A. DUTIES ACTUALLY PERFORMED ON PRESENT JOB.</b> To be supplied by Rater. Be specific. Give his duty assignment and all additional duties with enough specific detail to show scope of job in each area.</p>												
<p><b>B. DESCRIPTION OF OFFICER RATED AND COMMENTS.</b> These paragraphs should cover physical, mental, moral qualities of rated officer, specialties of value to the Army, and any special defects or weaknesses affecting his ability to do certain assignments.</p>												
COMMENTS OF RATING OFFICER				COMMENTS OF INDORSING OFFICER								
<p><b>C. ESTIMATED DESIRABILITY IN VARIOUS CAPACITIES.</b> Assume you are a commander of a major unit in war. Indicate to what extent you would want the rated officer to serve under you in the next higher grade in each type of duty described below. Place an X in the proper box, using the shaded NA area if the duty is not applicable. If line h is used, specify the nature of the specialty.</p>												
<p>a. Represent your viewpoint and make decisions in your name at a higher headquarters. b. Command a unit immediately subordinate to you on a combat mission. c. Be responsible in an emergency calling for initiative, coolness, forceful leadership. d. Work on an assignment requiring great attention to detail and routine. e. Plan all aspects of a military situation, using judgment, initiative, and coolness. f. Carry out an assignment in a civilian component such as ROTC, NG, or ORC. g. Represent you where tact and ability to get along with people are needed. h. Work on an assignment as specialist or technician. (Specify.) i. Carry out the duties of the type of work to which he is now assigned.</p>												
<p><b>D. IMMEDIATE RECOMMENDATIONS FOR CAREER DEVELOPMENT.</b> Be specific.</p>												
RATER'S RECOMMENDATION FOR ASSIGNMENT (MOS CODE)				INDORSER'S RECOMMENDATION FOR ASSIGNMENT (MOS CODE)								
RATER'S RECOMMENDATION FOR FURTHER TRAINING				INDORSER'S RECOMMENDATION FOR FURTHER TRAINING								
<b>E. ENTRIES ARE BASED ON →</b> (RATER WILL CHECK)		INTIMATE DAILY CONTACT	FREQUENT OBSERVATION OF THE RESULTS OF HIS WORK			INFREQUENT OBSERVATION OF THE RESULTS OF HIS WORK			ACADEMIC RECORDS	OFFICIAL REPORTS		

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67-1

PART 1

IBM FORM LT.S. 1100 F 1429 REV.

FIG. 3. Front sheet of new rating form incorporating personal information.

with precautions to prevent cross-contamination, criterion information was collected on fifteen thousands of these same officers.

Analysis of the data obtained in these studies led to the conclusion that the new form (67-1) was clearly superior to the old form (67). This conclusion was based on several particulars:

1. The new form produced ratings which were definitely less influenced—less biased—by the rank of the rated officer. As a matter of fact, all ratings, and the criterion itself, were influenced by grade to some extent. This is indicated in Fig. 4, where the various scales are made comparable by converting each to standard score terms. This figure shows the average score for the officers in each grade group from 2nd Lt. through Colonel on the criterion<sup>2</sup> and on the various ratings. Two ratings are shown for the new form. One (labelled Section II, 67-1) is the score on the forced-choice elements—not separated in this version into the two areas of job proficiency and personal qualifications. The other (labelled Section III, 67-1) is the “over-all” rating—in this case a single 20-point scale on relative standing of the ratee in

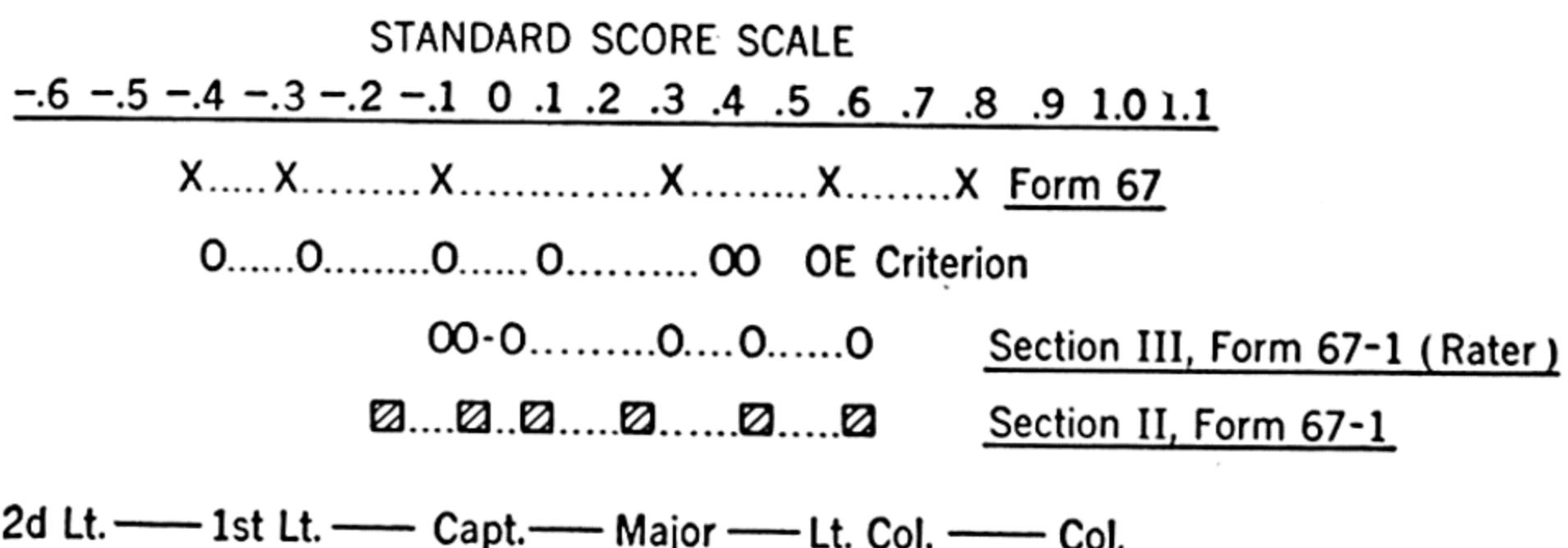


FIG. 4.

comparison with other officers of his grade. The fact of influence by grade can be attributed partly to real differences (colonels in general are doubtless somewhat more efficient than second lieutenants in general because of the Army's promotion policy) and partly to bias based on the prestige of rank. In any event, the older rating form (67) showed much more effect from rank than would be expected (more than the criterion index) while the two parts of the new form showed much less.

2. Scores on the new form are distributed in a way which permits better discrimination among officers rated at the two extremes of the scale. In testing terminology, the new form would be said to possess more "floor" and more "ceiling." As indicated in Fig. 5, which shows the actual distributions of scores on the two forms with range of scores equated, this advantage is more marked at the lower end of the scale, which means that the new form is particularly more effective in discriminating among officers rated low in competence.

<sup>2</sup> The criterion, in this case, was quantified by assigning values of 3, 2 or 1 for each "nomination" of most competent, second most competent or any other high position, respectively, and values of -3, -2, or -1 for "nominations" of least competent, next least competent or any other low rating; by dividing by the number of "nominators," multiplying by 10 to clear decimals and adding a constant of 30 to avoid negative values.

3. Scores derived from both forms showed an unmistakable tendency to be higher when the ratings were rendered officially rather than in an experimental trial, but this tendency was much less marked for the scores on the new form than for those made on the old form 67.

4. When scores on the two forms were compared with the independent criterion ratings of the same officers, the new form was generally shown to be more valid.

After further revision along the lines already described, the form was again submitted to experimentation. The results corroborated these earlier findings

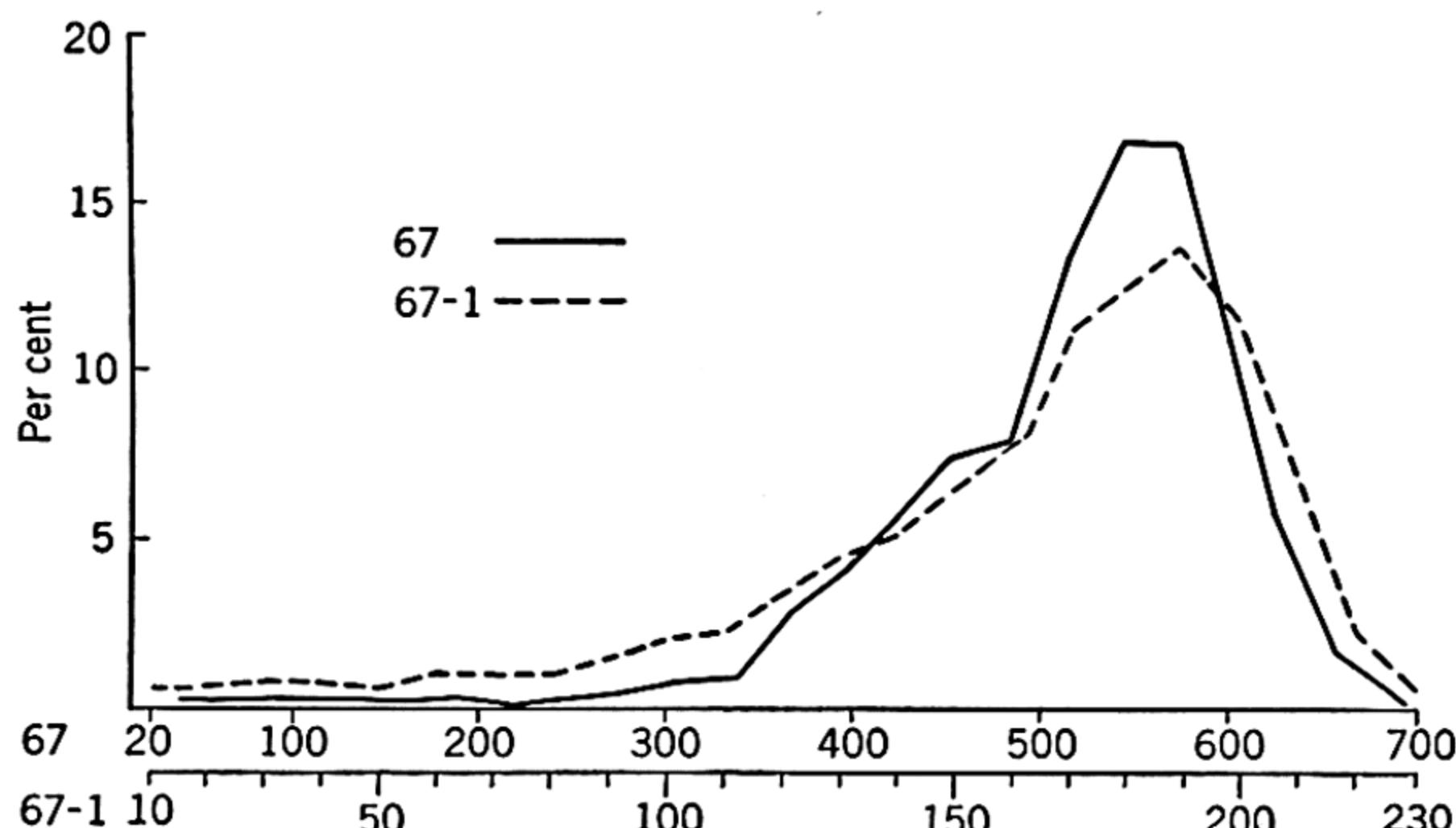


FIG. 5.

in every important respect. In fact, its tested validity was demonstrated to be even higher than before. After nearly two years of research, it was felt that the form was definitely superior to any other yet devised and tested in fulfilling the requirements of an adequate rating system for Army purposes—requirements outlined by General Witsell (3), The Adjutant General, in the following terms:

"It (an adequate rating system) should be capable of distinguishing between the best and the next best in the Officer Corps instead of lumping them altogether in the same category. It should likewise indicate which are least efficient and which next least instead of merely labelling a microscopic few at the bottom of the scale as 'unsatisfactory.' And finally, it should at long last and without fear or favor, admit that the average officer is truly average!"

**Technical Discussion. Construction of the Forced-choice Tetrads.** As already noted, the scaling and selection of the rating elements to compose the forced-choice tetrads is the nub of the problem. The basic assumptions underlying the method can be stated as follows:

1. Any real differences which exist between officers in competence or efficiency can be described in terms of objective, observable items of behavior.

2. These "behavior items" differ in the extent to which people in general tend to use them in describing other people, *i.e.*, in general favorableness,<sup>3</sup> and this tendency can be determined statistically.

3. These items also differ in the extent to which they characterize officers at one extreme of the true scale of competence as opposed to officers at the other extreme. The index of this difference, the "discriminative" value, can also be determined statistically.

4. Pairs of items can be selected such that they are equal in preference value but different in discriminative value. A rater forced to say which item is most (or least) characteristic of a ratee is thus unable to select solely on the basis of prejudice for or against him (since the preference values are equal). The rater is compelled to consider both alternatives and—theoretically at least—to do a more objective job of reporting.

The first step in the process of constructing the tetrads of items, as stated above, is obtaining brief descriptive essays of good and poor officers. These essays serve as the source of the behavior items pertinent to the job—in this case, the job of being an Army officer. This step is essential, not only to focus agreement on the nature of the traits involved, but also to insure that the behavior items are worded in the language familiar to those who will later be using the scale.

In the second step, a large pool of behavior items culled from these essays is prepared in list form and submitted to another group of officers—a group numbering in the neighborhood of 300 is generally used. Each man in the group is asked to select from among his acquaintances some one officer whom he knows well enough to rate with confidence, and to indicate for that officer the extent to which each of the items in the list applies to him. The following key is used for this purpose:

1. To an exceedingly high or to the highest possible degree
2. To an unusual or outstanding degree
3. To a typical degree
4. To a limited degree
5. To a slight degree, or not at all

After completing the entire list in this fashion, each man is asked to evaluate the officer he is rating on a scale showing his position with respect to over-all competence in a representative group of 20 officers of the same grade.

All lists are collected, arranged in order of the rating of over-all competence, and separated into upper (*U*), middle (*M*), and lower (*L*) thirds. An analysis is then performed on each of the items, and a determination made for the three groups separately, of the frequency with which each of the five alternatives was chosen for that item. Two values are then computed for each item.

<sup>3</sup> Though not a necessity of the logic involved, those items which tend to be used most often, *i.e.*, are generally "preferred" by raters in describing others, are invariably more favorable items—nice things to say.

1. *Preference Value.* Assume that there are exactly 300 officers in the group checking the lists, and consequently 300 officers rated, divided into the three groups of 100 *U*, 100 *M* and 100 *L*. For each item, the frequencies of each alternative are summed across the three groups (*U*, *M*, and *L*), multiplied by the alternative weight (one less than the number preceding that alternative in the key presented above) and these five weighted alternative frequencies in turn added to yield a weighted total sum for the item. This weighted total sum (which has limits of 0 to 1200 where *N* is 300) is divided by *N* and multiplied by 100 to give the preference index. As indicated, this value (with limits of 0 to 400) indicates the tendency of raters to mark people high or low on the particular behavior item. As here computed, low values of the index indicate a tendency to mark the item as applying to a high or outstanding degree; high values indicate little or no applicability for the item.

2. *Discriminative Index.* For each of the alternatives of a given item, the difference between its frequencies in the upper and lower groups is computed. These five differences are then added, without regard to sign, to give the discriminative index. At one extreme, where the distribution of alternative frequencies is identical for the upper and lower groups, this index will be zero. At the other extreme, where the two frequency distributions have no overlap, the value will (in this case) be 200. Low values of the index, obviously, indicate that the item is equally applicable to good and poor officers and consequently does not discriminate. High values, on the other hand, indicate gross differences between the groups in applicability of the item, and suggest that it represents behavior which has significance for success (or failure).

Figure 6 illustrates the method of calculating these two indices for a typical item.

Alternative.....	1	2	3	4	5	
Weight ( <i>w</i> ).....	0	1	2	3	4	
Frequency ( <i>f</i> ):						
Upper ( <i>U</i> ).....	1	0	6	6	87	( <i>N</i> = 100)
Middle ( <i>M</i> ).....	3	5	13	15	64	( <i>N</i> = 100)
Lower ( <i>L</i> ).....	4	11	27	23	35	( <i>N</i> = 100)
$\Sigma f$ .....	8	16	46	44	186	( $\Sigma n$ = 300)
$\Sigma f \cdot w$ .....	0	16	92	132	744	( $\Sigma fw$ = 984)
$d$ ( <i>U-L</i> ).....	3	11	21	17	52	( $\Sigma d$ = 104)

$$\text{Preference index: } \frac{\Sigma fw}{\Sigma n} \times 100 = \frac{984 \times 100}{100} = 328$$

$$\text{Discriminative index: } \Sigma d = 104$$

FIG. 6. Setup for determining preference and discrimination indices of forced-choice items.

Item pairs are made up by selecting insofar as possible two items equal in preference value and widely different in discriminative value. This selection is facilitated by plotting each item (identified by its number on the list) on a double entry table with preference values along the abscissa and discriminative values along the ordinate—both in suitable intervals. By entering any row in this table, two items close in preference can be picked that are widely separated on the ordinate scale. It is wise to avoid choosing items which are opposites in meaning since this eliminates the forced-choice element. Also, though the same item may be used in several pairs, it is wise to avoid too much repetition of this sort, since it tends to reduce the "scope" of the scale and necessarily raises the item intercorrelation; it may also inject an extraneous factor if the rater strives for "consistency."

Finally, pairs of items are combined to form tetrads. One pair with low preference indices (favorable) is combined with a second pair having high (unfavorable) preference indices. There is no logical basis for this step, but experience has demonstrated that if single pairs are used with instructions to indicate the most characteristic, there is considerable rater resistance to those pairs that have high (unfavorable) preference indices. By combining high and low preference pairs with instructions to choose the most and the least characteristic, rater resistance is materially reduced. The same end can be achieved by presenting high and low preference pairs (as pairs) separately with appropriate instructions for each.

**Scoring Forced-choice Rating Scales.** Tetrads are formed from two pairs of items. The members of each pair are matched for preference value. One member of each pair differentiates good from poor officers. The other does not. It is possible, because of the way items are thus combined into tetrads, to key forced-choice scales by assigning a point (plus or minus as the direction of the discrimination indicates) to each of the two discriminating members of each tetrad.

Forced-choice items may, however, act differently in combination with other items than they do by themselves. Consequently, it is always desirable to establish the key on the final set of tetrads. In doing this it is necessary to include enough tetrads so that those which fail to stand up on the final cross-validation can be eliminated from the scoring key. Needless to say, the cross-validation should employ an external criterion.

In one experiment on a group of 24 tetrads (96 items each of which could be marked as most or as least characteristic of the ratee), 75 percent of the items were scored in the same way after cross-validation as they would have been scored by a predetermined key based on the original preference and discrimination values. It should be noted that while items which had discrimination value (either positive or negative) in the predetermined key may have lost their value, and while some items which did not discriminate in the original study came to do so in the cross-validation run, there

was no instance in which an item which discriminated in one direction in the first experimental situation reversed its direction of discrimination in the cross-validation run.

The establishment of keys on the basis of a cross-validation experiment rather than from the use of the discrimination indices increases the validity of the rating. The experience of the Personnel Research Section indicates that the extra work involved in this additional step is justified by the increased validity that results from it.

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## Part Four: PSYCHOLOGICAL TESTS

### 1. Use of Tests in Employee Selection

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*Mason Haire*

Reprinted from *Harvard Business Review*, 1950, 28, 42-51, by permission of the author and of the Graduate School of Business Administration, Harvard College. "Many a personnel man," writes the author, "starts with the straightforward idea of picking better people for employment," turns to tests for help, and ends up in a "bewildering morass" of technicians' terminology. In this article, Dr. Haire's task is to advise management away from the position of unthinking reliance on selection tests and to make, instead, a critical evaluation of the pros and cons in each situation.

Psychological testing programs for selection of employees have a subtly seductive way of engendering a kind of unthinking reliance on their output. We slip quite easily into accepting their "scientific" numerical answer as a substitute for human decisions about people.

This point can be illustrated dramatically by the well-known story of the two groups of air force cadets—1,000 selected by an elaborate battery of psychological tests for navigator school and 1,000 similarly selected for pilot training—who got switched through a clerical error and yet still had as good training records as other groups not so misclassified.

Whether this story is true or only a legend, it portrays a situation which could have happened. It is entirely possible that, rather than being sharply aware of the actual differences in talents between the men who were directed to the wrong camps and previous groups which had been properly placed, the service schools could have had so much confidence in the selection procedures that in the mixed groups the same proportion would pass or fail as in the other groups.

In other words, even if tests can perform an effective job of selecting men with the right talents for a given position, there is such a thing as relying on them too strongly and not trying to appraise them critically for the possible disadvantages and dangers they may present in actual practice.

One other aspect of selection testing makes it seem especially appropriate to investigate the possible drawbacks. Psychological tests lie on a sort of border line between techniques that are entirely in the province of the lay-

man and those that are shrouded with all the mysterious performances of the technical expert. Many a personnel man starts with the straightforward idea of picking better people for employment—a reasonable goal. He turns to tests for help and finds himself in a bewildering morass of correlation coefficients, validities, and restricted ranges—clearly the bailiwick of the technician. For this reason, it seems especially worth while to consider some of the implications that follow on the introduction of psychological tests.

It should be pointed out that in the subsequent discussion reference is made to formal psychological tests of the usual type designed to measure aptitudes, skills, interests, and characteristics of potential employees.

**Relation to Total Problem.** One of the first things to consider is the weight that can be given to any course of action—selection testing or anything else—in a general personnel policy. In other words, we cannot assume without first exploring the whole problem that selection testing is the program that should be followed. Let us take a particular hypothetical case to help formulate the problem.

For any given plant we can set down a list of several things that make us think something needs improving, a list of symptoms from which we can work backwards toward the causes. Many things might go into this list: absenteeism, high turnover, low morale, grievances, low production, high costs (direct or indirect)—whatever things we see in the picture that make us think something is wrong.

Then alongside this list we can put down the group of things that may be possible causes of the difficulties, the places where we may profitably devote time and effort to improving the situation—selection, placement, promotion (transfer), training, supervision, engineering (including work layout, flow of materials, provision of tools), management (including setting of wages and working conditions), and the like.

Next we can try to assess the factors that are associated with the difficulties. Suppose direct production cost is singled out as apparently being too high. Part of the trouble may indeed be that we do not have the right kind of people hired for the job. Or is the way the job is supervised equally or more responsible? Perhaps some of the excessive cost comes from waiting for parts or from inefficiencies in the handling of materials; perhaps some of it is from the method of payment or the system of job assignment; if so, how much? Proceeding in this way we can evaluate for each factor in the difficulty list the relative importance of the various items in the list of causes.

Two more steps can be taken in the evaluation. (1) Because none of the items in the cause list can be brought to a level of perfection, we have to estimate how much improvement we can *reasonably* hope to make in each area. (2) We also need to estimate the cost, in money, time, effort, and personnel, of effecting a comparable amount of improvement in any one of the causes.

With these three factors—the weight of the cause in the total problem, the amount of improvement that can be reasonably expected, and the cost of producing this change—we can decide much more adequately to what point in the list we can most profitably direct our efforts. We can even set up a priority schedule in terms of a formula, if the problem is easier to handle that way: the cost of producing a change divided by the weight assigned to the cause as its contribution to the total problem, and then that figure divided by the amount of change we hope to effect.

On this basis we may come to decide on directing our efforts to selection testing. Or it may be that testing is shown to be less important than several other possibilities, like a new program for supervisors or a new merit-rating plan, and these are all that can be handled for the time being.

This kind of analysis seems particularly helpful in connection with testing. Because the technique of testing is relatively new, and because it seems to provide a substitute for a human decision that bothers many of us, it often looks more promising at the start than it actually turns out to be. Many times, the combination of relatively high-cost testing, relatively low contribution to the total problem, and relatively minor improvement over the present situation will combine to give testing a low priority among the things to be done.

It would be foolish at this point to say, "We should tackle all of the causes of our difficulties, not just one or two of them." In practice any company's resources of time and money are limited, and an attack on one problem is usually made at the expense of not attacking another. Concentrating on selection and placement may mean that the personnel department will be forced to put less weight on training and supervision than those activities should have. Consequently, it is only by an evaluation of the relative weight of factors that we can place them properly in an over-all personnel policy—selection testing included.

**The Philosophy of Testing.** Implicit in the procedure just described is the question of how to evaluate the actual effectiveness of psychological tests in improving the selection of employees. To do this properly, we must look at the bases on which testing is grounded. The use of selection tests rests squarely on two assumptions:

1. It is assumed that any given human ability is distributed over a range, probably in some fashion resembling a normal distribution curve with a few people who are very high or very low in the particular ability and most of them distributed around the middle. The immediate implication of this is that if we can (a) identify the ability we need on a particular job, (b) identify the people who are in the high part of the distribution scale, and (c) select that segment of the population, then we will markedly improve our labor pool.

2. The other basic assumption concerns the identification of people who are high in the ability in question. It is assumed that it is possible to construct tests

that are associated with the ability in question. The assumption is not necessarily made that the test measures the ability directly, or is a sample of the performance that the worker will produce on the job, but only that a high score on the test will be associated with the presence of a high level of the ability desired.

There are several things that follow these assumptions in practice. It would be difficult to quarrel with the rationale that human abilities are distributed along a range and that selection of the high portion improves our pool of abilities. To act on this point of view, however, means that we have already made several decisions. For one thing, when we frame our problem this way ("we need to raise the level of certain skills; therefore, we should select better people in hiring"), we imply that all the other factors that should be considered among the causes of difficulty have a lesser weight, and without facing the problem squarely we have decided that psychological selection is one of the important keys.

In adopting this point of view we have allowed one more requirement to slip in without our noticing it. In order for our selection to be valuable it is necessary not only that the ability we want be distributed in the population, but that it be distributed over a wide enough range to be useful. That is, there must be sufficient difference between the high and low ends of the scale to make a real difference on the job. This point is emphasized when we realize we cannot unerringly identify the highs and lows. Unless there is a large difference between them, we will have great difficulty in separating out a group that is predominantly high.

An example may make the operation of these two factors clearer. I once talked to representatives of a company that had just switched from bench-type inspection to an endless-belt production line system. The job was to grade the product, roughly by color and patterning of color, and to reject pieces that were faulty in these respects. The company wanted a set of tests of color vision which would let them select workers with the greatest color sensitivity—a most reasonable request. Some such tests are available and others could be devised with very little difficulty.

But the range of human differences in color sensitivity is so small in comparison with the discriminations required by the inspection that it seemed unlikely that the root of the problem lay in color weaknesses that were a constitutional characteristic of the workers. Human differences in color vision are distributed over a relatively narrow range. Moreover, in this case the inspectors were women, so the possibility of color blindness was unlikely in the extreme. Color blindness in women is about as rare in the psychologist's experience as appearances of Halley's Comet.

A close inspection, with plant officials, of the experimental inspection line that had been set up led to the conclusion on the part of the company that the problem could be solved by (1) utilizing the suggestions of the girls who

had been doing the job in its trial period, (2) making some changes in lighting and positioning of inspectors, and (3) introducing some training at the benches in the criteria for grading and rejecting. Initially, however, in the company's assessment of the problem the two implicit assumptions had slipped in: that selection was the key to the problem and that the ability they wanted was sufficiently widely distributed in the population.

Since selection testing rests on the basic plan of putting our energy into selecting a part of the range of human skills rather than into utilizing those we have to the fullest, we must ask searchingly whether the range to be selected from is great enough to produce the kind of change we want. If effort in improving utilization can be *added to* effort in selecting, the situation is ideal. In practice, however, we usually have a finite amount of effort to direct to the problem, and it seems to work out that the two programs compete with one another; selection is introduced *instead of* rather than *in addition to* maximizing the utilization of existing skills.

**Demand on Labor Supply.** Still another point comes up, as we get into the actual testing, which the industrial manager who is not familiar with the technical problems of selection is apt not to anticipate. As a direct consequence of our initial assumption about the distribution of human abilities, we may be led into a very real problem, namely, placing a tremendous demand on our labor supply.

Let us look at an example. Let us suppose that we have given an arithmetic test to 1,000 salespeople. An examination of the performance of these salespeople shows that the best 50% on our test make only one third of the errors in the store. With a two-to-one difference in errors between the upper and lower halves on the test, we might establish a cutoff score in the neighborhood of the score obtained by the highest 50% of our sample. That is, to reduce errors, we should not hire anyone who scores below the score obtained by 50% of our salespeople.

The implication of this decision for our labor pool is clear: we shall have to test two applicants for every salesperson we can hire. (Actually the figure will be slightly more than two for one, since our hypothetical test was validated on employees, who are presumably a higher group than unselected candidates, but the point remains the same.) Notice that we have had to place demands on our labor pool that were determined by the requirements of the job rather than the characteristics of the labor supply. So far we are probably safe, but it may get out of hand.

Arithmetical ability may not be enough for our salespeople. We must test other factors. Suppose we add verbal ability. If verbal and arithmetical ability were perfectly correlated—that is, if the highest person on one were highest on the other and so on down—then eliminating the lower half on arithmetic would throw out the lower half on the verbal test. But, if they were perfectly correlated, the second test would be of no use. Consequently, if we

add a new test to the battery, we shall try to get one with a low correlation with our first test so that it will add discriminating power rather than simply duplicating what we have. But this means that the two tests will not eliminate the same people; in other words, they will eliminate more people, and our cost in terms of applicants required becomes, at least to some extent, cumulative.

So far one might say, "Well, the job has high standards, and you have to look at a lot of people to find the right one. That has nothing to do with the test." But that is not quite the whole story. Tests are not perfect predictors. Some of the people the test said would not be successful would have made good records, and some of those the test said would be successful will eventually fail. Of course we can usually minimize the personnel "cost" involved in such failures by raising our cutoff score. It works like this: If we set our cutoff at that score obtained by only 20% of our original group, then, although we eliminate a few more who would have succeeded, we take only a very small number who will fail. But in moving our cutoff up to minimize our test's lack of predictive power, we have increased the number of people we must test in order to hire any given number of salespeople.

One seldom finds a job whose selection demands are filled by a single test. Consequently we run into the accumulation of eliminations as we add to the factors we are testing. When to this is added the fact that current testing does not usually yield more than medium predictive power and we are forced to raise cutoffs to compensate for that, it can be seen how real is this problem of requiring a larger group of applicants than the number we expect to hire.

It is difficult to state a precise mathematical formulation of the demand placed on the labor pool by using certain cutoffs for the selection, but an example will illustrate the point. During the war the Army Air Forces operated one of the largest personnel selection systems ever employed. Before test screening was applied, it was found that to produce 100 pilots, 397 had to be put into training—requiring a "labor pool" approximately 4 times as large as the number of men "hired," or a ratio of 4 to 1. With tests and a cutoff in the medium range, only 202 cadets had to be put into training instead of 397; but to get the 202 to put into training, 553 had to be tested—a labor pool requirement of 5.5 to 1. As the cutoff was raised, only 156 had to be put into training instead of the original 397; but to get the right 156 to put into training, as many as 1,000 had to be tested—a labor-pool requirement of 10 to 1, compared with the original 4 to 1.

The obvious question is: Can we afford higher cutoff scores in terms of the applicants we have available? In answering this question we must not fail to include also the "silent selection factors" that may operate to reduce our potential labor force. Is the employment policy free from racial discrimination? Few are. This acts to reduce the number of employables in

any group of applicants. Are older people rejected because of the potential expense under a pension plan? Are women candidates? Do customer contracts make it necessary to consider physical appearance? All these and a host of other factors consciously or unconsciously operate as informal selection tests, and they must be taken into consideration in calculating how many applicants have to appear at the employment office before the job is filled.

It is clear, too, that the significance of the effect of selection testing in labor-pool requirements is magnified in periods of relatively full employment. At the very time when applicants are less plentiful, their lower marginal quality and the fact that fewer have a previous work history to examine as part of the selection process make it desirable to raise the cutoff score and thus necessitate having a larger labor pool.

It should be pointed out here that we are much better off with regard to the demand that is placed on our labor pool if we are in a position to use our tests for classification rather than just for selection—that is, if we can use tests for placement as well as simply employment. In this way we can utilize many of the candidates who would otherwise have been eliminated by placing them in appropriate positions. On the other hand, although we reduce the cost in terms of employment interviewing, widespread classification testing will make a complicated and cumbersome system for employment.

Thus, to summarize, the first basic assumption—that human abilities spread out in something approaching a normal distribution—has led us to several further points. It has become important to question whether our policy should be to try to select the skills of a segment of the population or to utilize as fully as possible the skills in our normal labor pool. We have had to consider whether or not the abilities in which we are interested are distributed in a wide enough range in the population to make a difference. Finally, we have had to raise the very serious issue of the increasing demands that a large-scale testing program places on our labor supply.

**Relation of Tests to Individual Performance.** The second basic assumption—that tests will yield scores associated with the ability in which we are interested—leads to its own special group of problems in practice. One of the first things that comes up is that an employer finds himself at a peculiar disadvantage because he no longer understands, in the same way as before, why he hires or rejects a given individual. There is no longer the same simple relationship between the requirements of the job and the reason for hiring or not hiring. It was pointed out above that it is not necessary to assume that tests will yield a direct measure of the ability in which we are interested. The assumption is only that they will "yield scores which are associated with the ability." To see this point a little more clearly, let us consider the way a test is made up.

It is not quite true to say that there are two philosophies of testing, but

to look at the subject this way leads to a useful recognition of a tremendous difference of emphasis in the approach to the problem. On the one hand, testing is simply a refinement of informal hiring procedures. When we ask a candidate for a driver's job to park a truck to show his skill, for example, we are beginning a rough sort of testing procedure. At this extreme, we have many work-sample tests, merchandise-knowledge tests, and the like.

The other extreme is quite different. Ideally it proceeds in this fashion: For a given job we agree what the marks of a relatively successful and of a relatively unsuccessful worker are. We devise a very large test containing many, many items (which we may privately hope have some relation to the job) and test a large group of applicants.

Then, later, we identify those who have been successful and those who have been unsuccessful and go back to the original tests. We examine each item individually to see how our successful and our unsuccessful group did on it. If, for instance, 80% of the ultimately successful men answered it correctly and only 20% of the unsuccessful group did, we keep it because it discriminates as intended. On another item the percentages may be different. Let us say that 28% of the successful group got it right and 24% of the unsuccessful group. We throw the item out—"does not discriminate." Our final product is an aggregate of those items that did work, and we use this (tentatively) on the next batch of applicants.

The difference between the two extremes in the approach to testing is between a set of measurements of a skill whose relation to performance we understand, on the one hand, and a set of measurements whose relation to success is based on a statistical and correlative relationship rather than a logical or necessary one, on the other hand.

Several problems arise from the statistical approach. It leads into a maze of complicated technical procedures and commits the company to a continuing responsibility and dependence it may not want to assume.

Moreover, a certain amount of uneasiness may well accompany hiring on the basis of correlation rather than understanding. We are leaving the place where we can understand, in a certain sense, why we hired or rejected a person. It is one thing to say of a rejected applicant, "Him? He couldn't even back up a truck!" and quite another to say, "He scored lower than 38% of the applicants on a battery of tests that has been shown to have a .45 correlation with success on the job, and such a score indicates a relatively high probability that his work would fall in the lower half of the work group."

There are several consequences: (1) Management may be understandably uneasy at having this mathematical bridge substituted for its immediate understanding of the reason for rejection. (2) The company commits itself to considerable upkeep on the mathematical bridge. (3) The company is in a very different position, from the standpoint of public relations, with the union, its employees, its labor supply, and the community.

The public relations factor is seldom overlooked, but it needs additional emphasis. It has several facets. For one thing, some unions are suspicious of testing; it has on occasion had the reputation of being a union-busting technique. It makes no difference whether that is true or not; if the suspicion is there, the damage is done. For another, the responsibility of the company for the employees' success may seem, to the worker, to shift subtly. If after an informal interview the company and the potential employee both decide that he might as well try the job, that is one thing. If the company conducts a series of scientific-seeming tests and decides he is fit for the job, however, the employee's feeling is a shade different—he was not a partner to this decision. Never mind the fact that the company has not formally underwritten the responsibility; the worker's feeling may be there.

Employment, promotion, and transfer are sometimes handled by interview, sometimes by testing the applicant, and sometimes of course by both. For every case where I have heard a rejected applicant grousing that the interviewer did not find out the relevant facts for the decision, I have heard a dozen suggestions that the tests were foolish, that they did not really measure what he had, and that it was somehow their fault that he did not get the job. Again, let us not worry about whether the applicant is right; if the feeling is there, we have the potentiality of trouble.

This is one of the things that must be taken into account in assessing the cost of a selection program. If it threatens existing relationships, it can be potentially tremendously expensive and cause a radical readjustment of the estimate of its value to the plant.

**The Total Personality.** Another facet of the second basic assumption of selection testing is this: Human abilities distribute themselves over a range. Careful job specifications tell us what abilities we need to do the job. If we select people who are measurably high on these abilities, we will get the job done better, faster, and cheaper. On paper this rationale seems indisputable. If the job requires speed of reaction or hand-eye coordination, we should measure reaction time and coordination and take only those who are high on both. But reaction time and coordination do not exist in a vacuum. They are woven into the highly complex fabric that is a person, and that person may have high coordination and not produce on the job, or he may have learned ways to compensate for his low coordination so that he produces well on the job.

It is very difficult to specify job requirements exactly in terms of the sensory abilities required. Everyone is familiar with the blind person whose hearing and sense of touch have sharpened to take over some of the functions that are normally performed by the visual apparatus. I have a friend who was born with opaque lenses in his eyes; his lenses were removed in infancy, and to replace them he has a set of spectacles with different lenses for different distances. I go bird-shooting with him every year; I play squash

with him; and I ride with him as he drives his car. Any job specifications for these three tasks would put visual acuity high on the list. Any measurement of his vision would rank him extremely low in visual abilities. Yet his performance in all three activities is consistently good.

Thus, we must take care not to exclude such men from our work force by the mechanical measurement of skills and abilities. To carry the thought further, we must give some consideration to the way in which these abilities may be integrated into the pattern of skills that is a person. This leads us to the knotty problem of measuring the personality rather than discrete skills. It also leads to another knotty problem of writing adequate job specifications from which to draw the dimensions for selection. The upshot of this consideration seems to be that the definition of a necessary skill *in vacuo* and its mechanical measurement will not necessarily produce the optimum output on the job.

**Job Analysis and Validation.** Still another serious problem for the industrial organization arises directly from the second basic assumption in the philosophy of testing, and from the way in which tests are constructed. A test is built on a careful analysis of the skills and abilities that are required on a particular job. After this it must be checked (validated) against the performance of workers on the job. This measure of the workers' performance must be an unusually good evaluation in order to be useful for test construction purposes. Both of these steps—the job analysis to define the skills required and the manner-of-performance-ratings to serve as a criterion—will demand a good deal of time and effort from the industrial organization.

In the current state of selection testing, very few tests can be taken over directly and applied to new situations. They must be checked and rechecked and adapted to the particular plant. The process of checking a test means that a group (probably a group of present employees) must be tested and their test performance compared with job performance. The psychologist who handles the testing will—and rightly so—be very particular about the ratings that he will accept as a criterion against which to validate his test. Any company that has installed job specifications and a rating system for wage purposes and promotion knows the investment in time and effort required. Both of these tasks have even more exacting requirements for a good testing program.

The job is not finished when the test is installed. Just as a test for file clerks which has done successful selection for Company A must be revalidated in Company B's case before it can be used with safety, a test that works today has to be constantly rechecked and validated to adjust it to the changing situation. It may seem at the outset that the company is committed to a six months' period of analysis and preliminary testing, after which the test battery will be installed, a clerk taught to administer and score, and "that's that." However, some provision must be made for systematic re-evaluations

of the testing procedure and for the careful collection of data both on the tests and on performance.

There are several things that may happen and that must therefore be guarded against. The company may find that, instead of a six months' commitment, it is committed to a relationship without end, as long as the testing continues. The personnel department has acquired a load of record-keeping as well as the testing itself, and real demands are being made on the line organization for periodic evaluations of the success of those who have been tested. Again, the company may find it is tied to a long-term and expensive consulting relationship with the expert who installed the tests, and that relationship may prove cumbersome in its lack of integration into the personnel organization. Such factors as these bring unanticipated costs.

The second basic assumption in the philosophy of testing—that tests can be constructed which will yield scores associated with the appearance of abilities—has thus led us to face another series of problems in practice. For one thing, the construction of tests on the basis of statistical relationships leads the company to a position where it no longer understands, in a certain sense, why it hired or rejected an applicant. With this comes a group of public relations problems vis-à-vis the union, the work force, the labor supply, and the community. Again, we have seen that the procedure involved in measuring aptitudes must be used very carefully lest we eliminate the man who has learned to live with and compensate for his lack of skill, or hire the man who approaches the job in such a way that his skill is of no use to us. Finally, it has been pointed out that the installation and maintenance of a battery of tests may prove much more expensive, in terms of time, effort, and personnel, than would seem to be the case at the outset.

**Areas of Usefulness.** In connection with the question raised earlier in this discussion of evaluating the help that tests could give us, it was implied that some situations are much more amenable to improvement by scientific testing procedures than others. It might be well to go, in some detail, into the particularly likely areas for testing. Three categories of jobs seem to stand out: (1) jobs that are heavily loaded with easily identifiable skills and demand the relatively inflexible application of these skills in performance, (2) jobs requiring very special or unusual characteristics, and (3) jobs requiring a long, expensive training program before the applicant is useful.

The first classification will need more detailed treatment, but brief extreme examples can be given of the other two:

During the war several aircraft companies employed midgets to work inside the tail-sections of bombers on production. It would be patently foolish, with requirements as special as this, to hire from the normal run of job applicants and to hope by training or supervision to produce a man to fit the job. Job requirements approaching this extreme indicate one of the areas where it

may be wise to consider selection procedures based on measured aptitudes and characteristics.

A similar extreme example of the need for selection is where training is long and expensive. During the war the Air Force spent a day and a half giving a battery of 20-odd psychological tests to each air crew applicant—a tremendous expense. But here it was well justified, because there was an investment of nine months of training in each candidate before he became useful on the job. Keeping out one man who would have failed paid for the cost of many, many tests, to say nothing of the protection to both the candidate and his instructors in this special case. Thus, training programs approaching this extreme indicate another area where it may be wise to consider whether the cost of testing will not be easily amortized by the savings in training cost.

**Specific Skills.** Now to tackle the more subtle question of situations where testing is particularly useful because the job is heavily loaded with fairly specific skills. Several references have already been made to the conspicuous success of the Air Force in selecting air crew members. However, flying is a very unusual job. In very few cases does a job of major importance demand such a heavy concentration of inflexibly required mechanical skills. In most cases the situation seems to be, perversely, that the easier a particular skill is to measure, the less likely it is to be of primary importance in the job situation. We are much more likely to find that it is almost impossible to define the skills required on the job, and that the work situation is flexible enough to allow individuals to meet it in a variety of ways using whatever skills they have.

At the other extreme from the selection of pilots, thus, we find an almost equally conspicuous lack of success for selection tests. The problem, for instance, of identifying in advance good retail salespeople or good executives has never approached the kind of solution that has been possible for, say, typists. Everyone is familiar with cases of salespeople who are brusque and even rude with customers but who have a loyal and devoted clientele. The secret seems to be the way in which they do it—and so far we have been markedly unable to measure or predict this “way they do it.”

As we get into the cases where jobs are less loaded with specific skills and more flexible in the requirements they put on a person, we begin to approach a new area of testing. Instead of tests of specific skills and abilities we begin to need more complex tests of personality. Such tests, fairly highly developed for clinical diagnosis, are just beginning to be adapted to the purposes of personnel selection. They seem to offer promise, but in most cases they are not yet sufficiently developed for selection purposes.

Under the general heading of “where to test” one point needs re-emphasis. We have mentioned before the demands that testing makes on the labor supply. The point can be turned around. Wherever there are large numbers

of applicants for every job or high turnover, tests will have the best chance. Testing is a percentage proposition. It aims to raise the probabilities of correct prediction. It may be wrong in any one case; its success lies in the average. For this reason it leans heavily on large numbers to do its best work.

**Intangible Influences.** One final point should be made on the general subject of testing. This point has been implicit in many of the arguments presented above, but it deserves separate treatment. It deals chiefly with a set of intangibles and is often very hard to pin down. Hence the need to look at it clearly is all the more important. I think of it as the problem of "The Panacea Philosophy and the Dream of the Workerless Factory."

One of the drawbacks in considering a testing program is the unfortunate way it may come to seem to be a substitute for practically anything else in the business. All of us are subject to so many frustrations in deciding who will be best for the job, in training workers and foremen, in setting policies, and so forth, that a technique which runs itself routinely and generates a number-result that is either black or white with no shades of gray is a tempting escape. All too often it is cast in the role of the answer to all our problems, which it most definitely is not.

Are we having difficulties in training new workers so that they fit into the job? Maybe if we selected the right people, the situation would be better. Are the foremen falling down somewhat in their job? They suggest that, if we gave them the right kind of people, there would be no problem; maybe they are right. Are we caught between the millstones of a wage demand and high production costs? Maybe if we selected our workers better, costs would go down. It is not a question of *whether* this sort of influence will get into the company; it will. It seeps throughout the organization and turns up almost anywhere. The question that has to be answered is *how much* it will get around, and how much of it can be afforded.

This is what I call the panacea philosophy. It may appear either as, "This will be a big help in all of our problems," or as "We've always had trouble with *x*; now we've got *y*, it'll take a lot of pressure off *x*." Testing will not solve all the problems, and it probably will not take pressure off *x*. If anything is to be *added* to the present picture by introducing tests, just as much pressure will have to be put on foreman training as before. The gain will come from the *addition* of selection—not its substitute value. Unless this is clearly seen and anticipated, the idea of psychological testing can conceal a potentially dangerous escapism.

The symptom of this escapism appears most clearly when members of management read magazine articles about the factory where all the work is done automatically with endless belts and automatic cranes for transport, with photoelectric cells and thermocouples for inspection and decision, and with the final product, finished and packaged, delivered at the end of the line. It is basically a dream of a day when the medium through which we can

achieve production will be something which we can construct, understand, and control completely—when we no longer work through the intractable medium of human beings.

In many ways a machine is a wonderful thing. We know, roughly, how to lubricate and maintain it to produce maximum efficiency, what kind of energy input must be supplied, and within limits what its top productive capacity is. A group of machines never put any pressure on one another for exceeding any given rate of production; they do not inch wash-up time back little by little from quitting time. But to take advantage of the human's flexibility and adaptability, his resourcefulness and ability to make decisions based on a changing complex of factors, we must pay the price in other less useful variations in human skills, characteristics, and aptitudes.

Testing seems to be the expression of this dream in the area of personnel policies. In employment one of the stickiest of all parts of the job is the final decision when one wonders, "Will he do the job for us?" Here more than anywhere there is the temptation to turn to the security of numbers. "I.Q., 97; manual dexterity, 103; clerical ability, 121; arithmetical reasoning, 81—he's in." It may be true that what we have done in testing the applicant is to simplify the employment decision by regularizing and standardizing the assessment of factors involved in success on the job. But it often smacks so of a convenient and approved way to avoid the decision that it seems worth while to ask ourselves to what extent we do have a solution and to what extent an escape.

#### CONCLUSION

There is no intention here of denying the merit and usefulness of psychological tests for selecting personnel. Their many and varied successes are so clear that they cannot be overlooked and do not need re-emphasis. The purpose of this discussion, however, is to focus a critical glance on the kinds of value that may be obtained from testing and the kinds of cost that may be exacted in return.

Buying and installing a test program is not like buying and installing an electric typewriter—a relatively discrete, independent, and useful unit. Instead it is more like installing a complex accounting machine whose work means changes throughout the organization. The implications of a testing program for employment will similarly spread throughout an industrial plant, and the effect of these implications needs to be carefully evaluated. Thus, the cost of a testing program should be carefully weighed, with an analysis that goes well beyond the initial expense in dollars and cents.

The costs are many. A testing program changes management's relation to employees, and perhaps to the union. It changes the work of the personnel department, and perhaps its organization. It places many demands on the line organization for cooperation. Although psychological tests for selection

may yield a real improvement, let us examine carefully how great an improvement we may expect and how expensive it is likely to be.

In order to avoid the subtle persuasion that there is in the idea of psychological measurement, it may be well to approach it this way: Begin on the theory that you do not need and do not want selection tests. Examine the possibilities carefully—their assets and their liabilities. Then if you decide that tests will help, you are on comparatively safe ground.

The alternative to a reliance on psychological tests is not simply hiring every applicant. The growing role of a strict seniority system makes it more and more important to do the best job possible of employment screening. To this end, we must use whatever techniques are available—skilled interviewers, weighted application blanks, and perhaps even tests. But, by the same token, we must put an increasing emphasis on training, supervision, and job requirements, so that we will maximize the utilization of the people we do hire.

## 2. Some Neglected Principles of Aptitude Testing

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*H. M. Johnson*

Reprinted from the *American Journal of Psychology*, 1935, 47, 159-165, by permission of the author and of Karl M. Dallenbach. Two hypotheses, which the author considers fundamental for adequate aptitude testing, are presented. The first is that an absolute measure of an aptitude is impossible, but that any occupational field demands several abilities, and that the person who is a success in the field will be able to meet each of these demands. The second hypothesis asserts that "any defining set of demands forms a class, which is the logical product of certain other classes, while at least some of the factor-classes which make up the logical product are themselves the logical sum of constituent demands." The method by which these hypotheses might be adjusted to aptitude testing is considered.

In this paper I shall present two hypotheses which deserve the consideration of every one who is trying to detect any of the special aptitudes, whether actual or potential, that different individuals may possess. Although both hypotheses appear to be defensible, my immediate aim is to exhibit them for consideration, rather than to argue the question of their factual truth. But if they are factually true, then all their logical implications are factually true also, and some of these implications are especially important. One of them explains why few tests of special aptitudes have yet been discovered which have much diagnostic value. A second implication is that, except by accident,

tests that are constructed according to the present method cannot be much improved—by enlargement, for instance—to the point of utility, for they are fundamentally unsound. Thirdly, the two hypotheses imply a method. If the hypotheses are true, and if the method is feasible, the way seems open to diminish the frequency of misplacements of individuals which the present tests permit. If the method is not feasible, the hypotheses imply that we must either abandon our attempts to diagnose aptitudes and predict successes, or else content ourselves with determinations that are unsatisfactory.

First of all, we must deal with a presupposition that underlies many, and perhaps nearly all, attempts to devise tests of aptitudes, achievements, and skills. That supposition is, that these traits can be graded, so that one may somehow determine (directly or indirectly) how much of any of them an individual has. Or, it may be conceded that one cannot find an absolute measure of an aptitude, but it has been urged that one can yet measure the deviation of each individual's aptitude from some arbitrary zero, and thereby say how much more of it one individual has than another. Thus, one hears such questions as these: As a general, how much better than Napoleon was Lee? As a preacher, how much better than St. Chrysostom was T. DeWitt Talmage? As a composer, how much better than Haydn was Beethoven? As a teacher, how much better than Professor A is Professor B? Not only are such questions asked, but some psychologists have tried to answer them. All such attempts presuppose that aptitudes, successes, skills, can be graded.

The first hypothesis which we are to consider sets aside this presupposition. It asserts that such a notion as that of aptitude or success is not absolute, but strictly relative to some set of demands which are being made of the individual, and which he is trying to meet; that it has no meaning unless these demands are specified; and that the proper judgment is not to what degree the individual meets these demands, but simply whether he satisfies them or not.

It is admitted that any occupational field proposes more than one set of demands; namely, one set for each specialized "job" within the field. It is conceded that these sets of demands may be arranged in order, e.g. according to the number of contestants who satisfy them, according to the reward that is paid to those who satisfy them, and in still other orders; but the problem of grading the ordered demands presents the same difficulties as the problem of grading aptitudes and successes. We shall return to this question later.

The second hypothesis concerns the manner in which the members of a set of demands are combined. It asserts that any defining set of demands forms a class, which is the logical product of certain other classes, while at least some of the factor-classes which make up the logical product are themselves the logical sums of constituent demands. To appraise this assertion we need to recall two definitions.

*Logical Product.* Given two or more constituent classes which we may denote as  $A$ ,  $B$ ,  $C$ , . . . respectively, their logical product is the class  $A \cdot B \cdot C$ . . . . Each of its members belongs to Class  $A$ , and also to Class  $B$ , and also to every one of the other factor-classes. Thus, in one very shallow-minded, haughty and supercilious group, every member is a scholar, and also a gentleman, and also a judge of good whiskey. This group is the logical product of these three constituent classes.

*Logical Sum.* The logical sum of two or more constituent classes is the class which includes the members of each. For example, if the constituent classes are three, namely,  $A$ ,  $B$ , and  $C$ , their logical sum is the class the members of which belong to Class  $A$ , or to Class  $B$ , or to Class  $C$ , whether they belong to more than one of the constituent classes or not. If  $A$  is the class of scholars,  $B$  the class of gentlemen, and  $C$  the class of judges of good whiskey, their logical sum is the smallest class which includes:

1.  $A \cdot B \cdot C$ , i.e. the class of individuals who are scholars, and are also gentlemen, and are also judges.
2.  $A \cdot B \cdot \sim C$ , i.e. the class of individuals who are scholars, and are also gentlemen, but are not judges.
3.  $\sim A \cdot B \cdot C$ , i.e. the class of individuals who are not scholars, but are gentlemen, and are also judges.
4.  $A \cdot \sim B \cdot C$ , i.e. the class of individuals who are scholars, but are not gentlemen, and are judges.
5.  $A \cdot \sim B \cdot \sim C$ , i.e. the class of individuals who are scholars, but are not gentlemen, and are not judges.
6.  $\sim A \cdot B \cdot \sim C$ , i.e. the class of individuals who are not scholars, but are gentlemen, though they are not judges.
7.  $\sim A \cdot \sim B \cdot C$ , i.e. the class of individuals who are not scholars, and are not gentlemen, but are judges.

The relationship between the logical sum and the logical product of three constituent classes is imperfectly shown in Fig. 1.

Note that each of the seven subclasses which additively constitute the logical sum (i.e.  $A$ , or  $B$ , or  $C$ ) is itself a logical product. Note also that the logical sum ( $A$ , or  $B$ , or  $C$ ) excludes no individuals except those included in the logical product  $\sim A \cdot \sim B \cdot \sim C$ : in this example, those who are not scholars and are not gentlemen, and are not judges.

Note that the requirements of admission to any class, such as the class of scholars, Class  $A$ , may be met in a variety of ways. It is essential that the individual should be master of the details and internal principles of some one or more particular fields, and relate his special information to a wider field of human interest, knowledge, and problems. If he satisfies this condition, it makes little difference in which field he is expert. Hence, the class of scholars includes those who have this mastery of archeology or of Greek, or of mathematics, or of logic, or of physics, or of psychology, or of engineer-

ing, or of painting, or of sculpture, or of history, or of literature, or of what you may choose otherwise. In other words, the class of scholars is the logical sum of the cultured experts in any one or more than one of these particular fields.

Respecting Class *B*, which in this instance is the class of gentlemen, it also appears to be the logical sum of certain constituent classes. Perhaps the essential requirement is that the individual should habitually manifest magnanimity, understanding, generosity, and consideration for the rights and feelings of others, and express these attitudinal patterns by responses that

are so interpreted by the group to which he is attached. Thus, we find a difference in the external behavior-pattern of the British gentleman, the Chinese gentleman, the Turkish gentleman, the Abyssinian gentleman: a particular individual may gain access to the class of gentleman if only he manifests the social behavior-pattern of any of these (and the other) subclasses, provided that his intention is evident and understood.

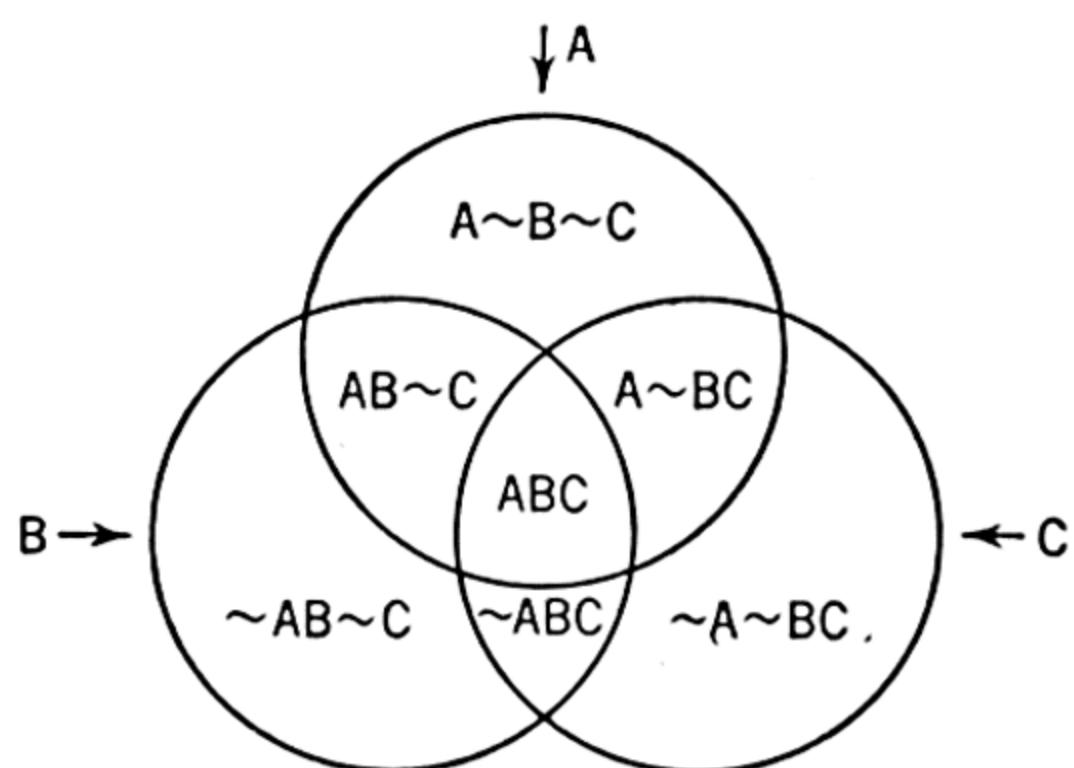
Similarly, with respect to Class *C*, which includes all judges of good whiskey. The essential requirement is that the judge should select the good from the collection of good and

FIG. 1. A diagram showing the relationship between the logical sum and the logical product of three classes, *A*, *B*, and *C*, represented by the three circles. (The symbols  $\sim A$ ,  $\sim B$ ,  $\sim C$  denote the classes the members of which are excluded from *A*, *B*, and *C*, respectively.)

bad, so as to please his friends with his offerings, and conventionally appraise the judicious selections which they may offer him. It is indifferent whether he judges the whiskey by pouring it into a glass and sniffing it, by rubbing it between his fingers, by rolling it over his tongue, by swallowing it and then exhaling, or by applying some quick and certain chemical test. Hence the class of "judges" includes all who discriminate, by one method or by some other, but who use effectively the means that they do employ.

We may now abandon this particular illustration, and turn to the general assertion which is formulated in the hypothesis; namely, that the class of individuals who succeed in any particular job includes all those and only those individuals who meet the classes of demands, *A*, *B*, *C*, etc., all at once. In other words, the successful individuals have command, all at once, of certain classes of skills; these classes enter as logical factors into the production of occupational aptitude or success, but since, by hypothesis, any factor-class may be a logical sum of particular skills or classes of skills, our judgment takes the following form.

Given a specified occupation, if an individual is successful, apt, or skilled



in it, he is a successful *A*-individual, and also a successful *B*-individual, and also a successful *C*-individual, and so through the list of factor-classes of skilled individuals. But, he is a successful *A*-individual if he has command of the special skill  $a_1$ , or of the special skill  $a_2$ , or of the special skill  $a_3$ , or any other special skills of which Class *A* is the logical sum. Likewise, he is a successful *B*-individual if he has command of the special skill  $b_1$ , or of the special skill  $b_2$ , or of the special skill  $b_3$ , etc. Similarly, he is a successful *C*-individual if he has command of any of the special skills  $c_1$ ,  $c_2$ ,  $c_3$ , etc. So on through the list of factor-classes.

Hence, he succeeds in this occupation if he satisfies the occupational demands  $a_1$ , or  $a_2$ , or  $a_3$ , . . . or  $a_n$ , and also  $b_1$ , or  $b_2$ , . . . or  $b_n$ , and also  $c_1$ , or  $c_2$ , . . . or  $c_n$ , and also by any means whatever the rest of the factor-classes of demands.

Note that he is an occupational failure if he fails all the constituent demands in any factor-class such as *A*, or *B*, or *C*, etc.; whereas he is an occupational success if he satisfies at least one demand in each factor-class.

Thus, according to the two hypotheses, the diagnosis of vocational aptitude or success depends upon the simultaneous combination of several classes of skills, some members of each class being interchangeable with other members.

The conventional manner of making aptitude-tests, however, takes no account of interchangeability. The tester tries to detect as many of the special skills, such as we have denoted by the small letters, as he can; he then assigns a weight to each, and takes the sum of the weights for the subject's absolute score in the test.

I shall now mention four special cases, which go to show the kind of result which this procedure can yield.

*Case 1.* The subject has command of at least one skill in each of the factor-classes *A*, *B*, *C*, . . . , and of many skills in at least some of these classes. His score in the test will be high; the correct diagnosis is "success."

*Case 2.* The subject has command of only one skill in each of the factor-classes. Unless there is great disparity in weighting, his score will be low; but the correct diagnosis is "success."

*Case 3.* The subject has command of none of the skills in at least one of the factor-classes, and of only a few skills in any of the others. His score will be low; the correct diagnosis is "failure."

*Case 4.* The subject has command of none of the skills in one of the factor-classes, but has command of many of the skills in each of the others. His score will be high; the correct diagnosis is "failure."

From these considerations it is evident that a high score may be associated with either success or failure, and a low score with either failure or success.

For example, consider the special skills that one must have to be an operatic tenor-singer. I have some of them. I am sensitive to small differences in pitch; I have good breath-control; I can sing what I do sing in key;

I can enunciate distinctly; I can use good phrasing. Now if you weight each of these skills and take the sum of their weights, you will have to give me a finite score in aptitude as an operatic tenor-singer. But I fail one requirement that every operatic tenor must fulfil, in that I cannot make a musical sound vocally on a high note. The other special tenor-skills which I have therefore contribute nothing to my aptitude for that vocation, nor do the other tenor-skills which I lack contribute further to my ineptitude as a tenor.

This example has a perfect analogy in the field of differential diagnosis in medicine. Consider some disease, whether actual or hypothetical, which can be unequivocally determined only in its later stages, or in a post-mortem. Meanwhile, the physician bases his judgment on what he calls a "syndrome," which is a class of concurrent symptoms, or concurrent classes of symptoms. Thus, the syndrome also is a logical product, of which some, at least, of the factors may be logical sums of particular symptoms, each of which has the same diagnostic significance. Let us suppose such a syndrome, formed by the concurrence of three classes of symptoms; namely *A*, *B*, and *C*, each of which is a logical sum of particular symptoms. Then, we may readily imagine three patients who have equivalent syndromes. The first patient has the special symptoms  $a_1$ ,  $b_1$ , and  $c_1$ ; the second patient has the special symptoms  $a_1$ ,  $b_2$ , and  $c_1$ ; the third patient has the special symptoms  $a_2$ ,  $b_1$ , and  $c_2$ . Thus the first patient and the second patient have two symptoms in common; namely, symptoms  $a_1$  and  $c_1$ . The first patient and the third patient have one symptom in common; namely, symptom  $b_1$ . The second patient and the third patient have no special symptoms in common. Nevertheless, by hypothesis, the three patients are correctly judged to have the same disease. I have been told that instances of this type occur frequently in medical practice.

Note that if the patient has at least one special symptom in each of the factor-classes of symptoms in the syndrome, the diagnosis is positive; if he lacks all the symptoms in any of the factor-classes, the syndrome is incomplete, and the diagnosis must be negative. In this event, the physician may do some foolish things, but he probably will not say, for example, that the patient has two of the three of the classes of symptoms that concur in the syndrome, and that therefore he has 66.6% of the disease. But if he should do this, he would be following the same general procedure as the aptitude-tester employs in making a point-scale rating.

I believe that the hypotheses which we have considered are factually well based. I may be wrong, but unless I am wrong, we cannot hope to do much with aptitude-testing in the placement of particular individuals until we replace the point-scale system of rating by one that is radically different. By enlarging our lists of questions, and by differential weighting, we can still improve our predictions a little, but we do not thus remove the defects that inhere in the point-scale method. If we should thus improve our diagnoses, the reason will be that we have successfully groped into a part of the pro-

cedure which our hypotheses indicate as being necessary. This procedure now calls for detailed consideration.

To begin with, we set aside the presupposition that an individual's occupational skill, ability, aptitude, or success can be graded. To say that he has a certain quantity of any of these traits is like saying that a patient has a certain quantity of a disease. Next, recognizing that the judgment of aptitude is relative to a class of concurrent demands, we undertake to set up, first, a complete statement of these factor-classes of demands, and secondly, a complete statement of the different ways in which each class of demands can be met. Then, if the individual, in any way whatsoever, can meet each of these classes of demands, all at once, we judge him to be apt in the occupation that is thus defined; otherwise we judge him to be inept.

For example, we may consider the various particular jobs within the field of truck-driving. If the job is that of driving the truck from one place to another in a freight-yard, through short distances, and with long pauses for loading and unloading between trips, all individuals can satisfy it who can handle the truck, and avoid accidents. Many individuals can satisfy these two concurrent demands. If, however, the job requires long trips, which have to be made within some specified time, it makes the additional demand of speed. Some individuals who meet the first two demands will fail this one. Suppose we add the demand that the driver should cover some specified mileage without wearing out his brakes. Those individuals will fail it who do not look ahead, and detect portents of changes in the traffic and react to them, instead of running into traffic situations which require sudden and powerful braking. If the job requires that the driver make personal delivery of his freight, as the driver of a milk-delivery truck must do, some demands of social adaptability have to be added. If he has also to make collections and handle money, still another set of demands are imposed.

Note that if the job is the one which we last mentioned, we may apply the test of ability to meet each class of demands in succession. Those individuals who fail the first class, in some manner or another, are definitely excluded. Those who meet the first set, but fail the second, are next excluded. Each factor-class of demands acts as a sieve, which excludes some of the unfit, and allows the fit, and also some unfit, to pass. Thus, a perfect test would apply all the factor-classes of demands that the job makes, and would exclude all individuals who failed any factor-demand by all the interchangeable means that may exist. This implies a "job-analysis" that is thorough, and which is also different in kind from the types with which we are most familiar.

This procedure is conceivable, is it also feasible? I do not know. I doubt whether any person could thus determine and classify the requirements of very many jobs during his professional life-time. But if our premises are correct, nothing short of this procedure will suffice. The case reminds one of the requirement: Draw a map of the other side of the moon. As every reader

knows, one half of the moon's surface is never turned toward the earth, and for this reason it can never be observed from the earth. To make a true map, one has to locate an observer, or some recording instrument such as a camera, out in the space beyond the moon, and make the observations from there. I do not expect this to be done soon, but I know that until it shall have been done, no verifiable map of the other side of the moon will be made. Similarly, our hypotheses imply that if we should ever devise any satisfactory tests of special aptitudes, those tests will utilize the pattern of procedure which we have just considered. If the conditions which it stipulates cannot be fulfilled, it is too bad for our aspirations.

But, if we cannot formulate all the classes of demands which a particular job imposes concurrently, can we still reduce the number of false diagnoses? Indeed, we can, if we can satisfy one condition. That is, that for each factor-class that we do consider, we list all the interchangeable skills that satisfy it. Then, beginning with the first factor-class, we test the subject by each of its interchangeable requirements in order, until he meets one or else fails all. If he fails all, he is instantly disqualified; if he meets one, he is eligible to test by the next factor-class. So we proceed, until he fails one of the factor-classes of demands, or else until he somehow has met all. Thus, each factor-class of demands will eliminate some failures, but no successes; and it is conceivable that at least in some jobs, we need only to apply exhaustively a few well chosen factor-classes of demands in order to eliminate nearly all the inept applicants.

Did space permit, I could mention some indications that at least some practical testers seem to be groping toward this form of procedure. But it seemed to me to be possible that the goal may be more quickly achieved, or else proved to be impracticable, if the seemingly necessary procedure is made explicit.

### 3. The Value of a Testing Program in a Tight Labor Market

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*Robert S. Selover  
Julius Vogel*

Reprinted from *Personnel Psychology*, 1948, 1, 447-456, by permission of the authors and Personnel Psychology, Inc. The value of selection tests in a tight labor market is sometimes questioned because the job openings outnumber the applicants. The authors demonstrate that in such a situation tests can be useful in assigning applicants to the jobs which best match their respective aptitudes. Data on clerical groups are presented to demonstrate this process of selective placement.

**A Hypothetical Situation.** It is clear that when there are more applicants for employment than there are jobs available a testing program can be used to eliminate those candidates who show poor aptitude for the vacant jobs, selecting only those who appear most likely to succeed. However, a testing program can be used to advantage even when the shortage of labor requires that every applicant for employment be hired to fill some position. Under such circumstance, provided there is more than one kind of job open, the testing program enables us to place the applicant in that job for which he appears most suited. This report illustrates the gains to be made in a business organization by placing people on clerical jobs according to their aptitudes, following the principles developed in the paper by John C. Flanagan: "Contributions of Research in the Armed Forces to Personnel Psychology," *Personnel Psychology*, 1948, 1, 53-62.

As an illustration, suppose there are 32 vacancies in each of three positions. Suppose the positions are general clerical, numerical filing, and calculating work. Assume further that different abilities are required for successful work in each of these three positions, and that there are 96 applicants for employment, each of whom must be assigned to one of the 96 vacancies. Now, half of these 96 applicants are below the average of the group in aptitude for general clerical work and half of them are above average. Hence, if 32 general clerical workers are to be selected at random from these 96 applicants, we can expect 16 of them to come from the top half of the group and 16 from the bottom half. Similar statements hold for the other two positions. Therefore, if the applicants are to be assigned to these three jobs at random, we can expect 16 of the people assigned to each position to be below the average of the 96 applicants in aptitude for that position. This will give us 48 people in positions

for which they are unsuited (*i.e.* below the average in aptitude). However, if each of the applicants is tested before assignment to any position, we shall probably find that:

*a.* Only 12 of these people are below average in aptitude for all three positions. This statement will appear more reasonable when we understand that most of these 96 applicants are above the average in aptitude for one or two of these positions, and below the average in aptitude for the other positions. Obviously, only a few are below average for all three positions. It is very easy to demonstrate that if the required aptitudes are independent, we can expect only about  $\frac{1}{8}$  of the applicants to be below average for all three positions. A corollary of this statement is:

*b.* Each of the remaining 84 applicants is above average in aptitude for at least 1 of the three positions.

Then, by a judicious assignment of these 96 people to the various positions, it will be possible to place each of the applicants except the 12 who are below average for all three positions in a job for which he shows better than average suitability. Thus by testing, we will have cut down the number of persons unsuitably placed from 48 out of 96 to 12 out of 96, without having to turn away a single applicant.

In actual situations, we do not have an equal number of vacancies to fill in each position. Furthermore, the abilities necessary for success in the various positions are usually somewhat related. For example, aptitude for filing work is somewhat associated with aptitude for other kinds of clerical work. However, the value of a testing program can be demonstrated for actual situations as well as for theoretical situations, and that is the purpose of this report.

**Putting the Theory to Test.** Before this project was undertaken, studies had been made to determine abilities important in selecting applicants for employment. A group of tests was selected, combinations of which were related to job performance on each of four different types of beginning assignments, general clerical, calculation, alphabetic filing, and numerical filing work. For convenience, we express performance on a combination, or battery, of tests for a particular job in terms of a nine point scale called a "stanine." A score of nine indicates excellent performance on the battery of tests for a particular job, a score of five indicates average test performance and a score of one indicates poor test performance. The extent to which the four test batteries are related to success on the four types of beginning assignments is shown graphically in Figure 1. These charts show that test performance is substantially related to job performance for each type of assignment. Thus, if it is possible to select applicants for assignment to these jobs on the basis of test performance, we can expect a corresponding improvement in work performance.

In order to see the effect of assigning employees to jobs on the basis of test performance, a representative group of 301 newly appointed employees was selected for study. All of these employees had taken each of the tests at the

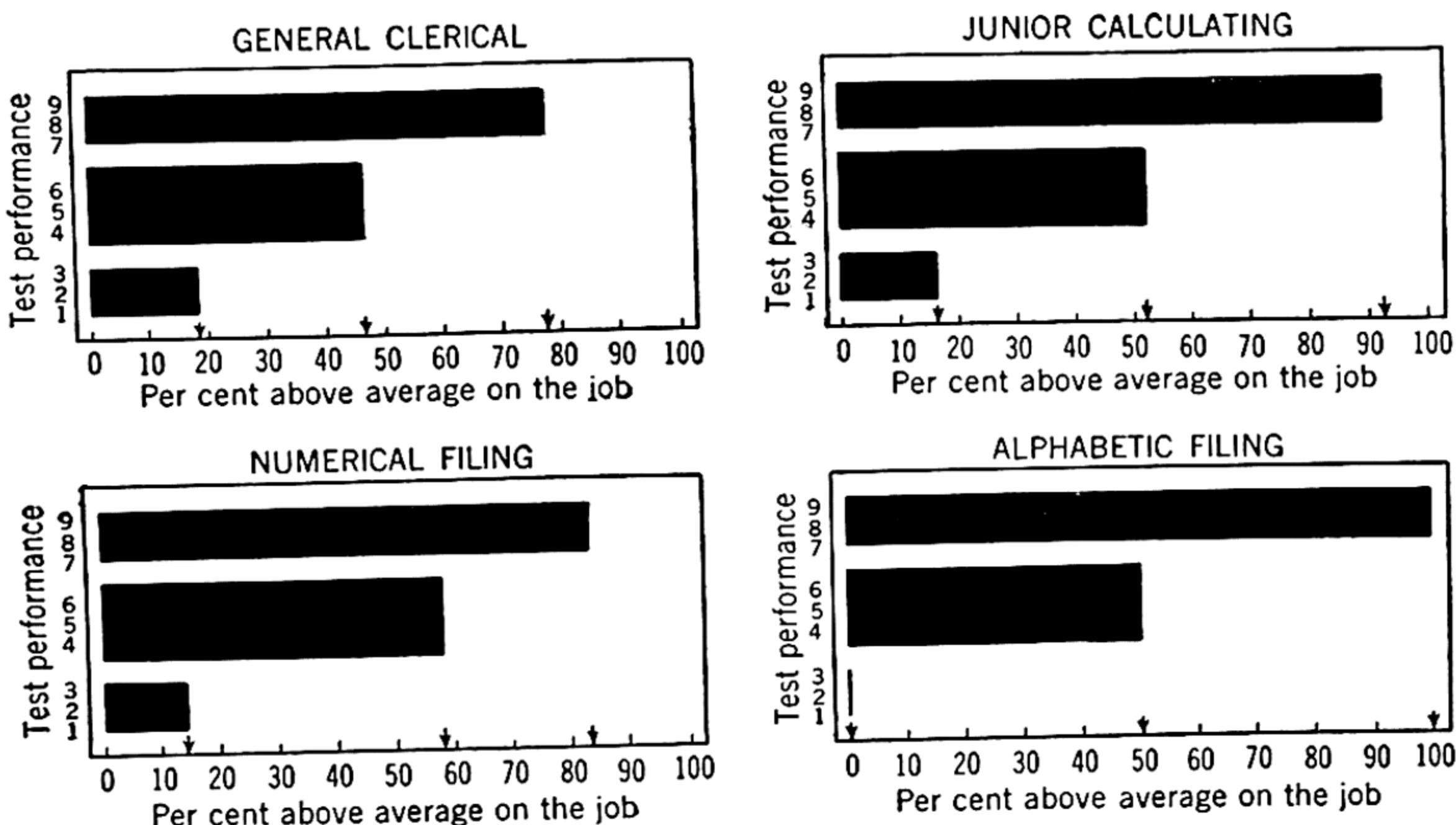


FIG. 1. Effectiveness of test performance in predicting job success.

time of employment, which made it possible to determine their scores for each of the four jobs. The distributions of test performance for each of the four jobs are shown in Figure 2. It will be noticed that all levels of test perform-

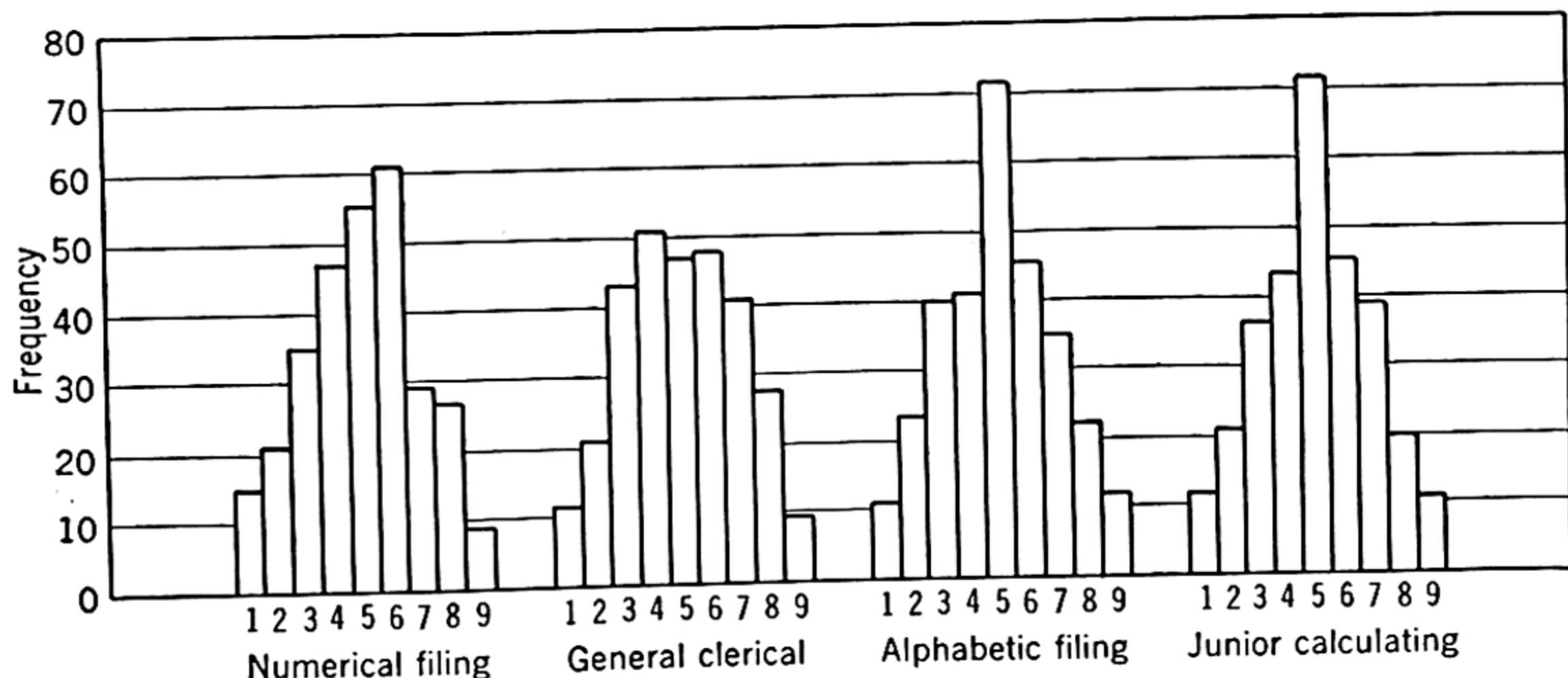


FIG. 2. Distributions of 301 clerks on four batteries.

ance are represented for each job. Since this group was used to establish the stanine distributions for each of the jobs, the average test performance for the group is 5.0 for each of the four different types of assignment.

In the first part of the study we supposed that these 301 employees were new applicants, of whom 201 were to be placed as numerical file clerks and 100 as junior calculators. We wished to compare the results we could obtain by random assignment of this group to the two jobs with the results we could obtain by placing each applicant in that job for which he was shown by his test performance to be better suited. It was not possible in every case to place the applicant in the job for which he had the higher test scores since we had to place exactly 201 as file clerks and exactly 100 as junior calculators. We

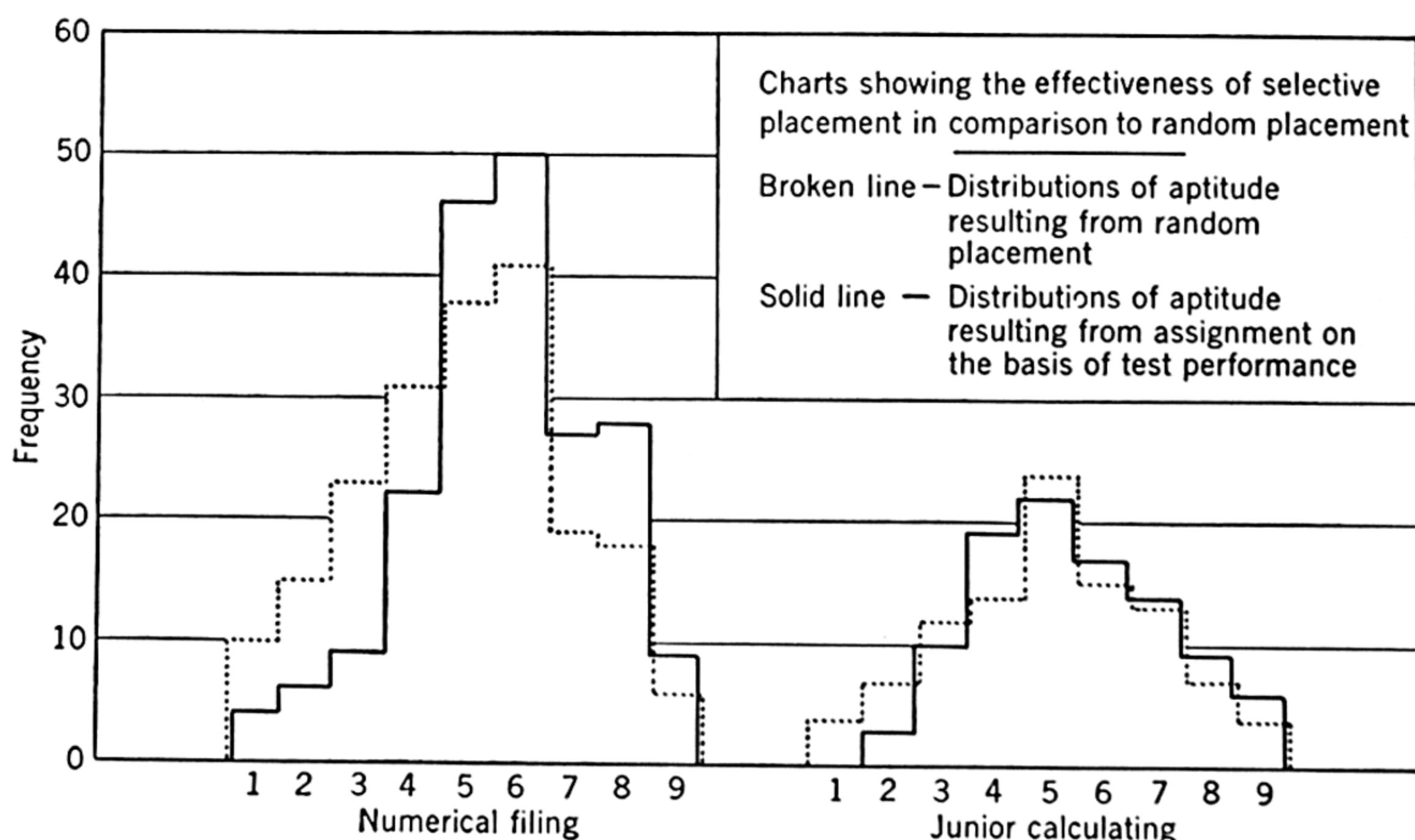


FIG. 3.

divided the applicants between the two jobs in this ratio because our experience shows that we hire roughly twice as many numerical file clerks as junior calculators. However, this restriction did not result in any serious misassignment of the people. The results of the assignment are shown graphically in Figure 3.

It will be seen that fewer applicants with scores of 4 or lower on the numerical file clerk battery were placed on this job than would be expected if the assignments had been made at random. Conversely, more applicants with scores of 5 or higher on the numerical file clerk battery were assigned to the job than were to be expected by chance. If we had picked the applicants for each job without regard to their test scores, we would have gotten a mean score on the numerical file clerk battery of 5.00 for the group assigned to numerical filing work. By our method of placement, the mean score of the group assigned to numerical filing work was 5.75. If we had wanted to select a group of numerical file clerks with an average score of 5.75 by eliminating

applicants for employment, we would have had to eliminate 22 per cent of the applicants. Similarly, the mean score on the calculating clerk battery of the group selected for calculating work was 5.48 contrasted with the 5.00 we would have expected if selection had been made at random. If we had wanted to select a group of calculating clerks with a mean score of 5.48 by eliminating applicants for employment, it would have been necessary to eliminate 13 per cent of the applicants. Thus, by selective placement we were able to obtain results which would otherwise be possible only at the expense of eliminating a considerable number of applicants.

**Selecting for Four Jobs.** Our next step was to suppose that our group of 301 employees were new applicants of whom 137 were to be assigned as

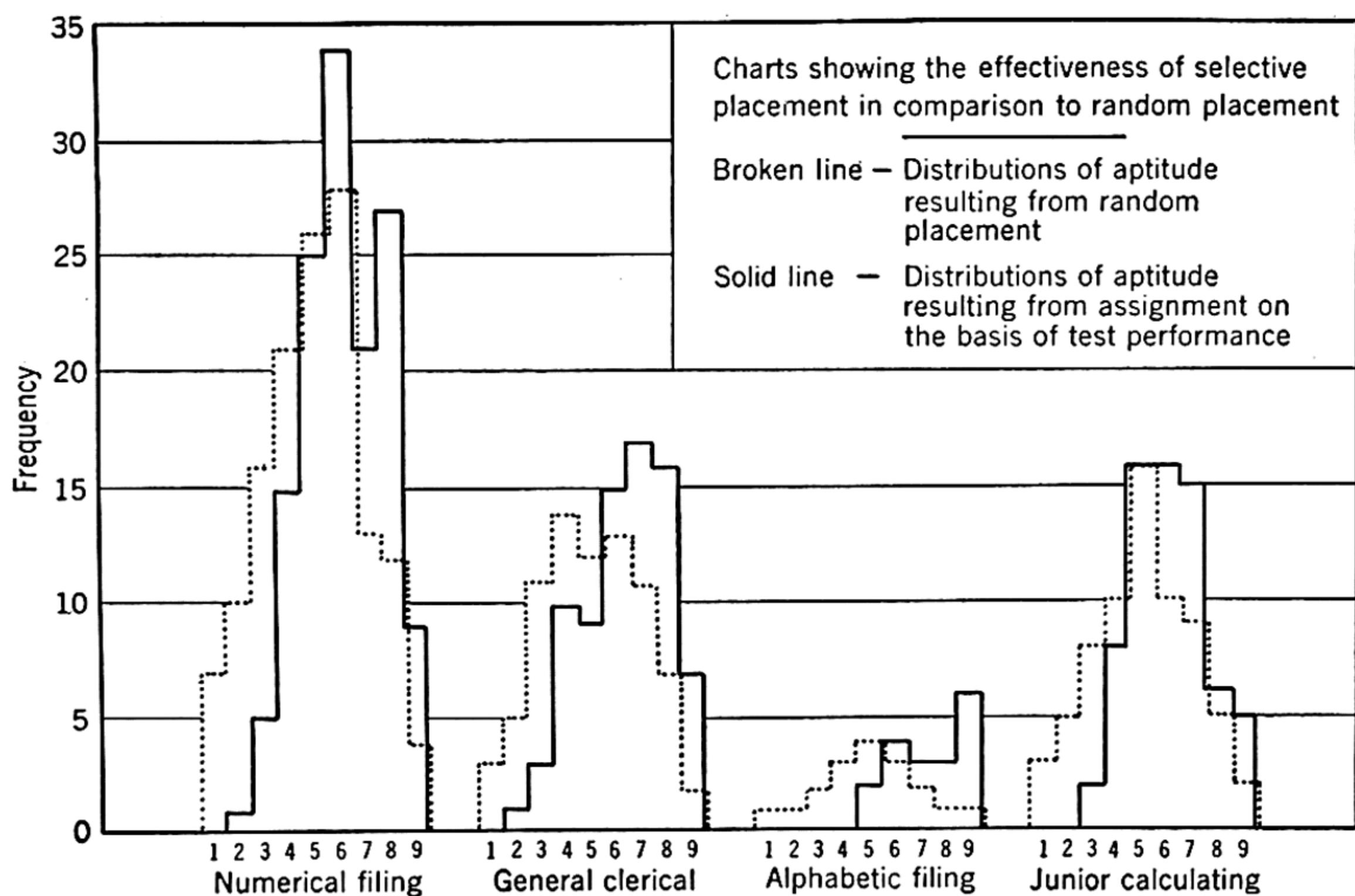


FIG. 4.

numerical file clerks, 78 as general clerical workers, 18 as alphabetical file clerks and 68 as junior calculating clerks. We divided the applicants among the four jobs in this particular ratio because our actual experience has been that applicants are hired for these jobs in such a ratio. With four positions to choose from in the assignment of each applicant, the results obtained were even more striking than before. Each applicant was assigned to that job for which he apparently had the most aptitude, consideration being given, of course, to the restriction on the number of applicants who could be assigned to any particular position. This consideration necessitated some misassignments. The results of the assignments are compared graphically in Figure 4

to the results that probably would have been obtained by random assignment of the applicants to the various jobs.

Our results showed a considerable improvement over random assignment to the jobs. It can be seen that we placed in each job many more applicants who had high test scores for that job and fewer applicants who had low scores for that job than we would have placed had we picked the applicants for each position without the benefit of test results. The mean score on the numerical file clerk battery of the 137 applicants assigned to the numerical filing work was 6.20 contrasted with the mean of 5.00 we would have obtained by random selection. Using the reasoning of the previous case, this increase in the mean score is equivalent to the elimination of the lowest 37 per cent of the 301 candidates. The mean score on the general clerical work battery of the 78 applicants assigned to general clerical work was 6.36 contrasted with the mean of 5.00 we would have obtained by random selection. This increase can be taken as equivalent to the elimination of the lowest 41 per cent of the 301 candidates. The mean score on the alphabetical file clerk battery of the 18 applicants placed as alphabetical file clerks was 7.39, a considerable increase over the mean of 5.00 we would have expected from random selection. Such an increase can be taken as equivalent to eliminating 72 per cent of the applicants for employment. Finally, the mean score of the applicants assigned to calculating work was 6.06; an increase in the mean equivalent to eliminating the lowest 33 per cent of the applicants. Thus, by selective placement we can greatly improve the calibre of new employees assigned to each job and still make use of every applicant for employment.

## 4. Evaluation of a Clerical Applicant Testing Program

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William J. Giese  
Frances Weigle

Reprinted from the *Journal of Applied Psychology*, 1948, 32, 581-586, by permission of the authors and of the American Psychological Association, Inc. The study, which was conducted at the David G. Cook Publishing Company, illustrates the need for critically reviewing employment testing programs to determine whether the tests are measuring the capacities, proficiencies, etc., which are significantly related to job success. The study is one of few in which the selection device was evaluated by using test scores at time of employment.

All employment testing programs should be critically and systematically reviewed to learn if the tests are measuring the capacities, proficiencies, etc., which are significantly related to job success. Such a study will point out any needs for changes in the program or determine whether or not the program is worth continuing.

At the David C. Cook Publishing Company the applicant load is relatively low. Employment tests, however, have been used as general interviewing aids. When sufficient data become available, standards or "local norms" in terms of test scores can be set up if there is a high relationship between the test scores and employee desirability. Such information will be especially useful when the number of applicants becomes more plentiful.

Employment tests have been used by Cook's for about 8 years. The company retained the services of a consulting firm for the purpose of installing psychological tests for the selection of clerical personnel in the early part of 1940. The Clerical Test D was given to most clerical employees and the test scores related to merit ratings. However, these early data on present personnel are not available.

Since 1940, the Clerical Test D and the StenoGauge have been given to nearly all of the applicants for clerical or stenographic positions. Other tests have been given to many of the employees, but only the two tests mentioned had sufficient data to permit an evaluation of their usefulness as selection and placement aids.

These tests were usually administered by the Personnel Manager from 1940 to November 1943, and since November 1943 they have been adminis-

tered by a personnel assistant who has an A.B. in Psychology or by a qualified consultant.

**Method.** To find out how useful these tests had been in selecting desirable personnel the authors investigated the relationship between scores made on the StenoGaugE and the Clerical Test D at the time of employment and subsequent experience with the people as employees.

They considered as possible criteria objective records of performance such as length of service, production, absenteeism, accidents, errors, and similar

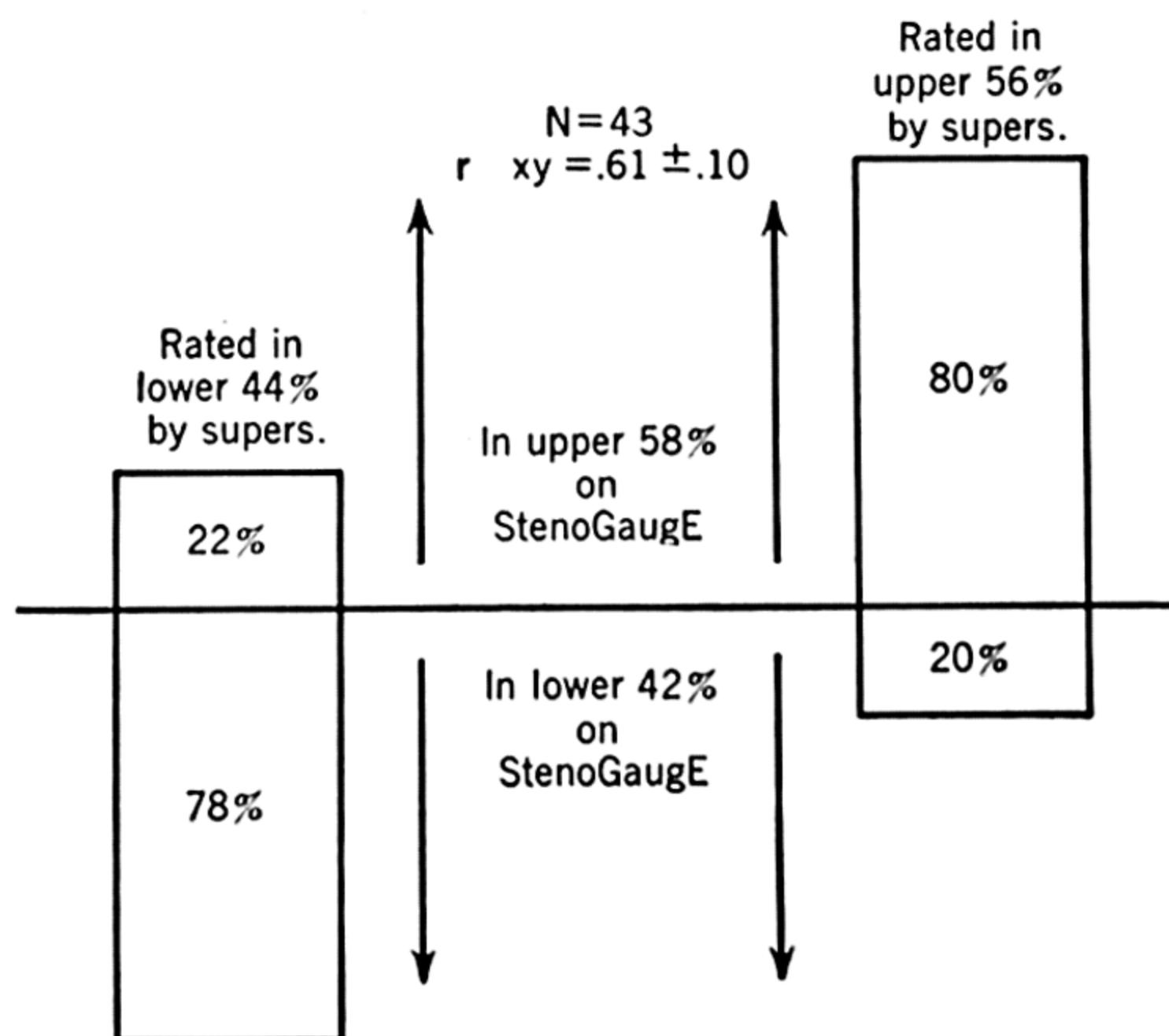


FIG. 1. How the applicant's scores on the StenoGaugE at the time of employment relate to supervisors' rating after three months of service.

records. They also considered as criteria, systematic but non-objective records such as: merit ratings, willingness to rehire at time of termination, estimates of promotability and similar systematic but non-objective records.

In deciding which of the available material just mentioned would be practical to use, the following standards were used: meaning in terms of final results, consistency and probable accuracy of the records, number of employees involved, and accessibility of the data.

**Results.** From the data which were practical to use, the authors found the StenoGaugE to be helpful in measuring typing and spelling proficiency since the test relates positively to both supervisors' ratings and supervisors' willingness to rehire.

The correlation between scores on the StenoGaugE and supervisors' ratings is  $.61 \pm .10$ . Figure 1 illustrates how well the StenoGaugE identifies those applicants at the time of employment who will be rated high and those who will be rated low by their supervisors after 3 months on the job.

Figure 2 shows that there is a positive relationship between the supervisors' willingness to rehire employees who have terminated and the employee's score on the StenoGaugE at the time of employment. Figure 2 also

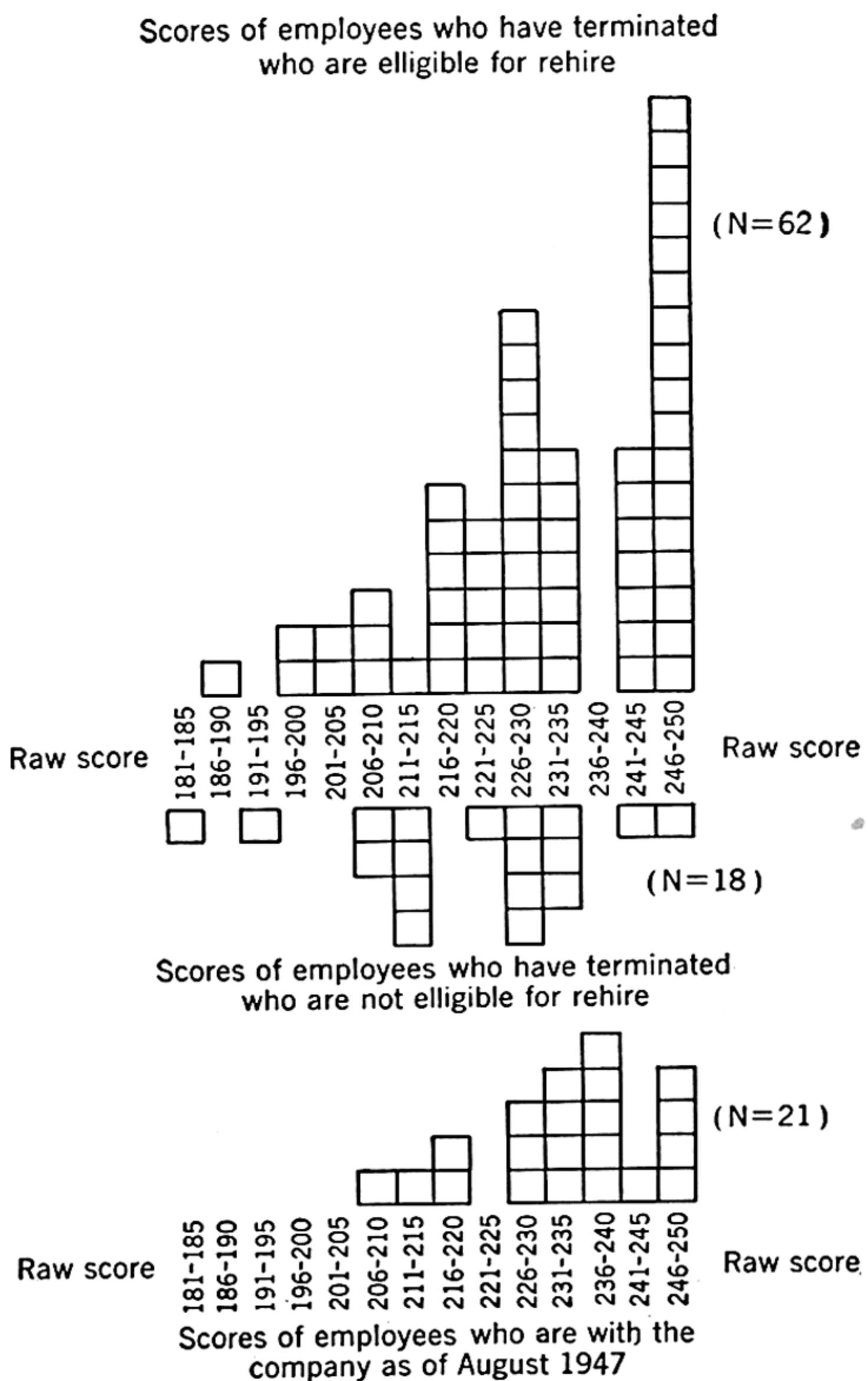


FIG. 2. Relationship between scores on the StenoGaugE and turnover (January, 1940, to August, 1947).

shows a positive relationship between remaining with the company and the score made on the StenoGaugE at the time of employment. Of the people who have left the company, those with higher scores on the StenoGaugE tend to work longer before terminating although  $r$  between length of service before termination and scores on the StenoGaugE is only  $.18 \pm .11$  (SE for an  $r$ , or .0).

From these relationships it was concluded that the StenoGaugE is doing

a reasonably good job of measuring proficiencies which are crucial to job success in the typing positions.

From the data which were practical to use, the authors found the relationship between Clerical Test D and supervisors' ratings of clerical employees to be not nearly as high as was the relationship between the StenoGaugE and the typists' ratings by their supervisors. The Pearson Product-Moment Correlation is  $.39 \pm .10$  between supervisors' ratings and test scores at the time of employment. Figure 3 illustrates, in graphic form, this relationship.

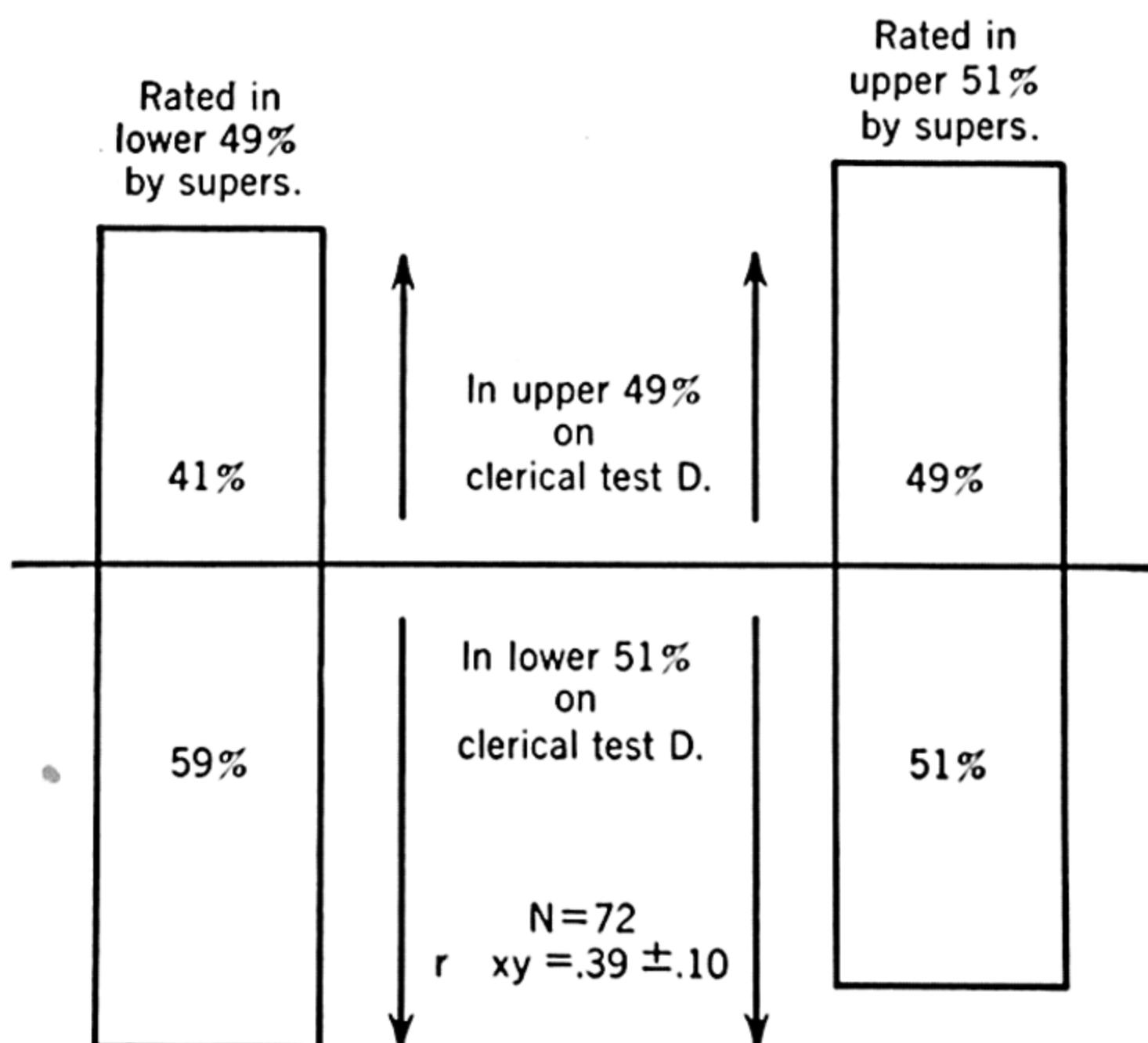


FIG. 3. How the applicants' scores on the Clerical Test D at the time of employment relate to supervisors' rating after three months of service.

No relationship was found between length of service of office workers and score on Clerical Test D. The correlation is .0.

With regards to turnover there is a low relationship between the supervisors' willingness to rehire a terminated employee and the employee's Clerical Test D score at the time of employment. Figure 4 illustrates this relationship.

From these relationships it was concluded that Clerical Test D is doing a poor job of measuring those capacities which are significant to job success in the general office.

#### SUMMARY AND RECOMMENDATIONS

On the basis of these findings the following recommendations were made to the David C. Cook Publishing Company:

1. The StenoGaugE should be continued to be used as an employment test for the typing jobs requiring as high a test score as the selection ratio will permit.

A revision of the scoring system should be considered which will give the test more differentiation at the higher levels.

2. The Clerical Test D should be dropped. An analysis of the various jobs for which it was being used as a predictor revealed they were not general clerical

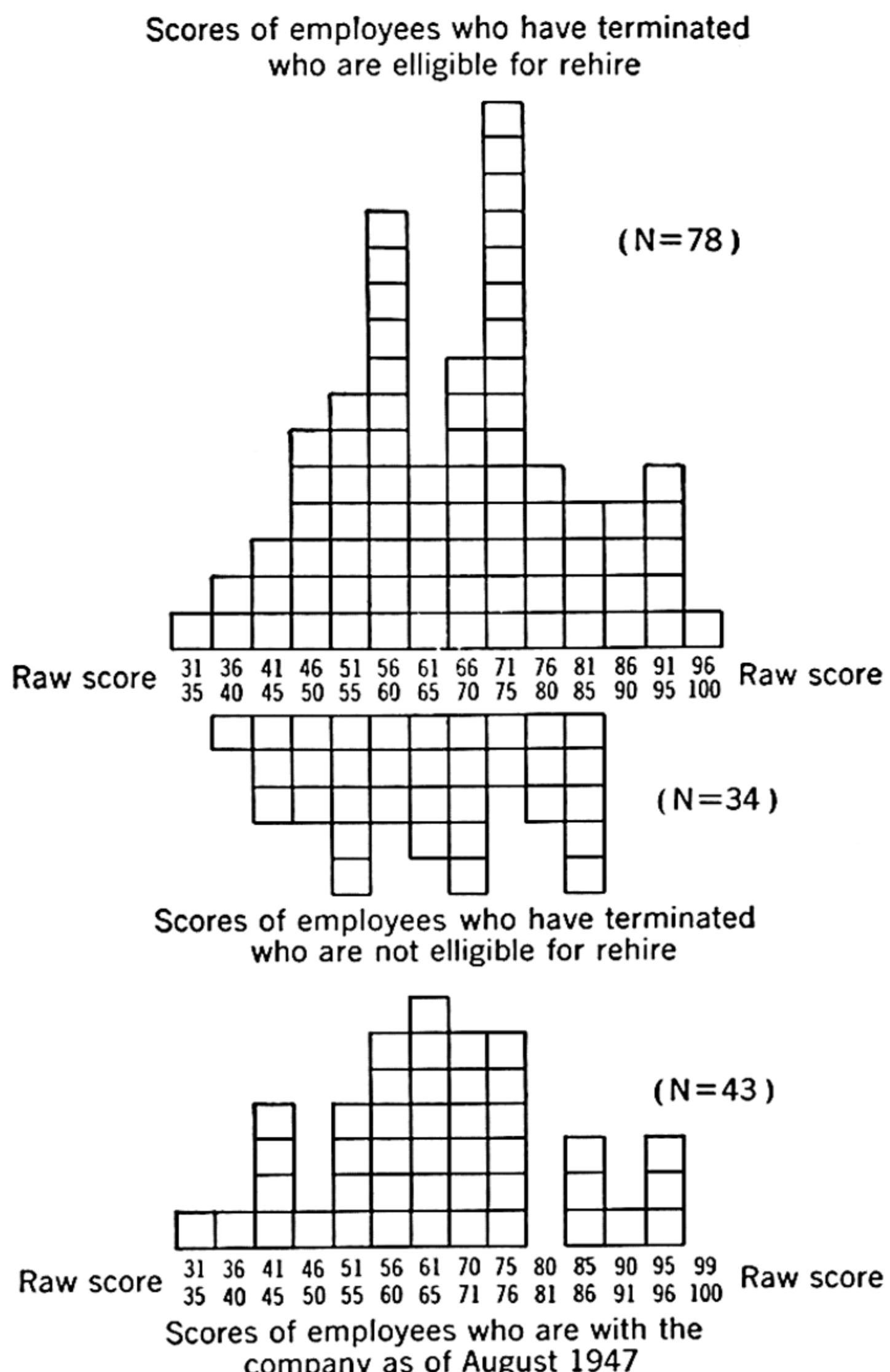


FIG. 4. Relationship between scores on the Clerical Test D and turnover (January, 1940, to August, 1947).

jobs, but were jobs which were more likely to be primarily filing, comparing numbers, etc., or jobs which were primarily computational. Apparently, the test does not measure reliably or validly this type of clerical ability. Furthermore, the scoring is rather involved and subject to error.

3. For the more strictly clerical jobs, an intelligence test and a clerical aptitude test are recommended.

4. For those office jobs which are primarily computational in nature, an intelligence test and an arithmetical proficiency test are recommended.

5. Since employment testing is established and accepted it is recommended that it be expanded to all applicants at the hourly rated and nonexempt salary levels for those jobs which demand capacities that are practical to measure in the employment office. The increase in cost would be negligible and pertinent test information might direct and shorten interviewing time.

## 5. Additional Distributions of Test Scores of Industrial Employees and Applicants

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*Myles H. MacMillan*  
*Harold F. Rothe*

Reprinted from *Journal of Applied Psychology*, 1948, 32, 270-274, by permission of the authors and of the American Psychological Association, Inc. It has frequently been observed that job applicants often make a distribution of test scores that is better than the distribution of scores on the same test made by employees against whom the test has been validated. Evidence is presented which indicates that the reason for the observed shifts is one of greater test-taking incentivization.

In an earlier paper data were presented to show that applicants for industrial jobs often make a distribution of employment test scores that is different from the distribution of scores on the same test made by the employees against whom the test had been validated.<sup>1</sup> That is, the distribution for applicants is shifted toward the higher, or better, end of the scale. Three possible variables in the testing situations that may account for this shift, namely age, military experience with tests, and combining office and shop applicants' data, were controlled in the previous analysis, and were shown to be unrelated to the shift. One other factor was partly controlled. This was the possibility that "the word gets around" among the supply of potential applicants with the result that only the "better" applicants apply. Another suggested reason was that the incentives to a good test performance were higher for applicants than they were for the employees who had been promised that their jobs would not be affected by their test results. It was concluded that this latter phenomenon was the reason underlying the shift.

Some additional data that are relevant to this problem have been collected and it is the purpose of the present paper to present these and to relate them

<sup>1</sup> Rothe, H. F. Distributions of test scores of industrial employees and applicants, *J. appl. Psychol.*, 1947, 31, 480-483.

to the problem. It is believed that these data lend further support to the hypothesis that the reason for the shift is one of greater test-taking incentivization, and not one of the word getting around.<sup>2</sup>

**Discussion.** If the hypothesis is true that the word gets around and attracts better qualified applicants, it appears logical to assume that the word takes some time in getting around. That is, the improvement in applicants' qualifications should appear gradually and not all at once. Thus, the improvement should be a gradual one and successive samples of applicants should show successively higher distributions.

On the other hand, if the reason for the shift is one of incentivization, the shift should appear suddenly in a first sample of applicants, and successive samples of applicants should give the same distributions as the original sample of applicants, all being equally higher than the original distribution for employees. This, of course, depends upon the samples being small enough to reflect any shifts that may occur. At the same time the samples should be large enough to give statistical significance to any results that are analyzed.

**Data from One of the Original Plants.** Data are available from one of the original plants for one of the tests. The data presented here are the only

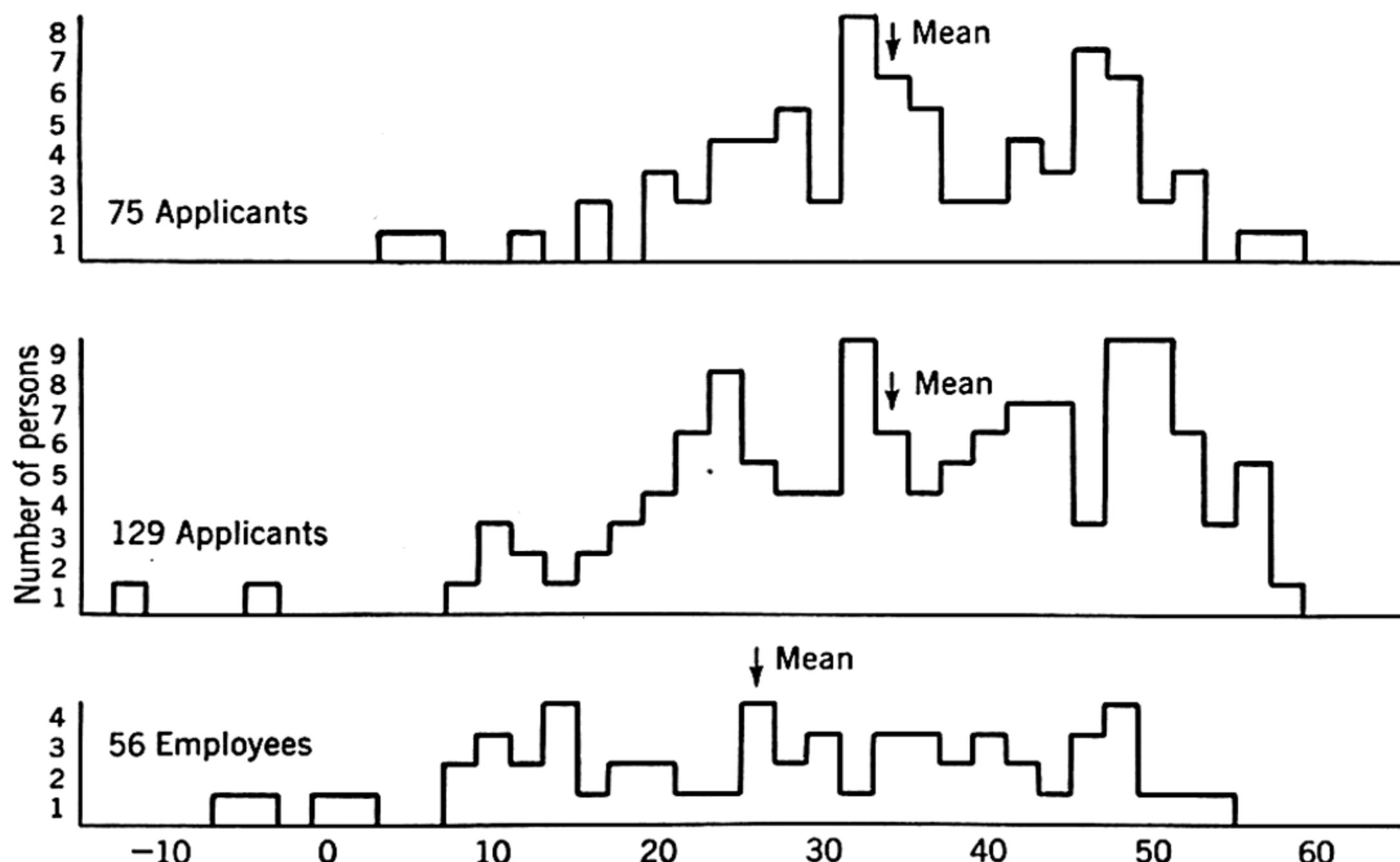


FIG. 1. Test scores of industrial employees and applicants on the Code Identification Test.

ones that are available from the original situations because of decreased employment (with the decreased turnover) in those plants and because in one instance another test has been substituted for one of the original ones.

<sup>2</sup> E. L. Stromberg. Testing programs draw better applicants. *Person. Psychol.*, 1948, 1, 21-29.

The Code Identification Test was originally validated against fifty-six employees. The first follow-up analysis was made after 129 applicants had been tested and a shifted distribution was found. A second follow-up was made when seventy-five more applicants had been tested. The distribution for this second group was practically identical with the distribution for the first group of applicants. These three distributions are shown in Figure 1.

These data are summarized in Table 1 where it can be seen that the critical ratio between the means of the two successive groups of applicants is 0.12.

TABLE 1. TEST SCORES OF EMPLOYEES AND APPLICANTS

Group	<i>N</i>	$\bar{X}$	S.D.	C.R.
Employees.....	56	27.8	15.33	
Applicants—1.....	129	34.9	13.85	2.97
Applicants—2.....	75	35.1	11.49	0.12

It is apparent that either the word got around immediately, once and for all, or else some other variable was operating. It is concluded that another variable, the incentivation of the various groups, explains this shifting of applicants over employees.

**Data from other Plants.** Data are also available from another plant in which the Wonderlic Personnel Test was administered routinely to all applicants. Some applicants were white and others were colored. The presence of a large group of colored applicants who live in one area of the city permits an ideal situation for the word to get around about the normal labor supply of this plant, if such is to happen at all.

The first three successive groups of one hundred applicants each, negro and white, were analyzed and are summarized in Tables 2 and 3.

TABLE 2. TEST SCORES OF NEGRO APPLICANTS

Group	<i>N</i>	$\bar{X}$	S.D.
1	100	9.9	7.92
2	100	9.0	6.23
3	100	8.4	7.19

The critical ratios are, for groups 1 and 2, 0.84, groups 2 and 3, 0.62 and groups 1 and 3, 1.35. It is especially interesting that these successive samples of applicants showed lower, not higher, mean scores. If the word got around

TABLE 3. TEST SCORES OF WHITE APPLICANTS

Group	<i>N</i>	$\bar{X}$	S.D.
1	100	18.7	8.57
2	100	17.2	8.52
3	100	17.7	9.16

here, it had a negative effect. This is contrary to the expectations of those who believe that the use of tests will automatically improve the qualifications of applicants.

The critical ratios for the white applicants are, for groups 1 and 2, 3.72, groups 2 and 3, 1.14 and groups 1 and 3, 2.45. Here again the shift was downward.

The same procedure of testing applicants before attempting to validate the tests was used at two other plants. In both instances standardized general intelligence tests were used. In one plant the second group of applicants had a higher distribution than the first group, with a C.R. of .40, and in the other plant the distribution shifted downwards, with a C.R. of 2.37. There were about 150 persons in each sample in both of these plants.

**Additional Controls Needed.** All of the above data point to the same conclusion, namely, that the use of tests has no effect on the qualifications of applicants. The mere use of tests does not attract "better" applicants. It is probably true that in a few instances some applicant may state that he has come to a specific plant because he heard tests are used and only intelligent people work there. But these are isolated instances, if they do occur, and are of no statistical significance.

The data presented in these two papers have been collected under actual industrial employment office situations. There are still some controls lacking before this problem can be solved in an experimental manner. For example, there is the possibility that the various test administrators may have, for some unexplained reason, affected the various testees differently. This possibility has been completely uncontrolled although in all instances standardized procedures were supposedly used. Nevertheless, the personalities of the administrators may have affected these situations.

It would be desirable to test a group of applicants and at a later date to re-test all those who had been hired. If the conclusion reached in these papers is correct, it would be expected that the re-test distributions would be lower than the employment office distributions for the same persons. The writers have heard of one instance where this was done, with the results described above, but no data are available to them on that point.

Another point is that the employees described in these papers were tested in large groups and the applicants tested either individually or in very small groups. Perhaps, the employees could have been more highly incentivized if they had been tested individually. On the other hand, it is possible that there was some social effect that did indeed lead them to get relatively high scores. If so, this group effect was apparently not as effective as was the incentive of a job that was held up before the applicants.

### CONCLUSION

The conclusions from present data are substantially the same as the conclusions of the original paper. When tests are validated against the existing employee force, a follow-up analysis is needed in order to check the critical score, if a critical score is used. The mere presence of tests in the employment office does not guarantee that applicants will be more highly qualified than are the present employees. The tests must be validated for the jobs in question. The greater test-taking incentivization of applicants appears to account for the shifted distribution of their scores as compared with the distribution of employees' scores.

## Part Five: INTERVIEWING AND COUNSELING

### 1. Interviewing

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*Orlo L. Crissey*

Reprinted from *Current Trends in Industrial Psychology*, Pittsburgh: University of Pittsburgh Press, 1949, pages 76-81, by permission of the author and publisher. A general discussion of the place and importance of the interview in personnel selection. Common sources of difficulty in attaining the objectives of a good interview are considered and suggestions made for improving its effectiveness.

Of all the steps in employee selection, interviewing is the one which is most frequently used, and is still the one on which most dependence is placed. There is a kind of receptive simplicity about the process which makes it look as if anyone could conduct a good interview and achieve the basic objectives of "securing information about the applicant, giving information about the job, and making a friend for the company." This point of view seems to be confirmed by the practice of most industries, since the typical interviewer is a man with less than high school education and with no specialized training in interviewing. He usually has had some shop experience which is believed to give him a knowledge of job requirements and he usually "likes people." The fact is that interviewers have been successful in selecting those applicants who make reasonably good employees. There is increasing evidence, however, that their techniques can be considerably improved and that a still higher proportion of successful employees can be identified.

There is no doubt that in the interview it is possible to observe a sample of the functioning personality of the applicant, which cannot be observed in any other way. It is possible to secure expressions of attitudes, turns of thinking, and interrelationships in the various personal aspects of the applicant's life, which tests and questionnaires might not even touch. The applicant will be working with people, and the interviewer, in a sense, represents these future teammates. The applicant may "have everything" but if, for instance, his attitudes and mannerisms would so irritate the present work group that they rejected him, choosing this man would still be a poor selection risk.

We wish, therefore, to conduct the interview in such a way as to secure that sample of the applicant's behavior and attitudes which most nearly repre-

sents his normal self. The selection interview has as its objective the eliciting of information about the applicant's total background, which supplements information obtained from other sources, and which can aid the interviewer in reaching a decision as to whether this man would be a satisfactory addition to the work force, and what specific job he should hold. We are primarily interested in such specifics as loyalty to employers, feelings of responsibility for his work assignment, degree of supervision he requires, and similar job-related behavior. The interview is a situation which gives the interviewer a chance to observe the applicant in action in a human relations situation.

Perhaps the most significant recent trend in interviewing is the recognition that the interview is an emotional experience for the applicant, and for the interviewer as well, though perhaps to a lesser degree. Application of some techniques already useful in clinical or therapeutic situations can therefore broaden the range of material the applicant presents for observation and thus improve the validity of the interviewer's judgment.

Improvements can be made in the interviewing process itself. To do this, we must first locate some of the possible sources of difficulty.

In the first place, the effectiveness of the interview depends on the interviewer. A more careful selection of interviewers is necessary. But we really do not know what kind of person makes the best interviewer. Should he preferably be one who is primarily extroverted rather than introverted? How much and what kind of training, education, experience should the interviewer have had, and what relation does this have to his results with applicants? These men represent industry in a most crucial way. They not only select, and thus determine the work force of the plant, but they are the front line of public relations. The need for studying the characteristics of successful interviewers is acute.

The second problem is the training of interviewers for the specific type of observation, rating, evaluation, and judgment which their job requires. Evidence shows that training interviewers to agree on the meanings of the terms they use, and to interpret behavior elements in approximately the same way, improves the agreement among them. What educational methods can be used among psychologically unsophisticated interviewers to increase the reliability of their observations and the validity of their predictions?

A very real problem in industrial interviewing is the time involved. For unskilled jobs, a few minutes of interviewing and a general "sizing up" of the applicant is frequently the practice. The more complex the job, the longer is the time spent in interviewing. What values would accrue to the employer and applicant if more time were made available? What seems to be the most satisfactory length of interviewing time for various kinds of interviewing?

The interviewer must cover certain aspects of the applicant's work experience, hobbies, interpersonal relationships, and the like, in order to know

him well and to judge his suitability for employment. To aid the interviewer in doing the obviously needed planning, various types of systematized, standardized, and pattern interviews have been prepared and published. There are undoubtedly advantages in having some type of guide, but there is a difference of opinion as to whether such a guide hampers or facilitates informal discussion. The slavish adherence to standardized interviews can reduce them to orally administered questionnaires which, of course, is not the intent. Helping interviewers spot important evidence through the use of key questions is valuable since we all tend to ride our own hobbies in evaluating people, but it is less certain that these key questions are the same for all types of jobs.

Still another problem in interviewing is that of getting the interviewee to talk, and to talk about things which really contribute salient information about himself. The use of general questions rather than specific ones, the attitude of letting the interviewee carry the major conversational load, and some of the specific techniques of question-asking used in nondirective counseling, seem to be valuable. A great deal still remains to be learned about the extent to which directive and nondirective interviewing can be combined and what methods are most effective for selection purposes when the time limits, as well as different job levels, are included in the consideration.

An even more important problem is the interpretation of what the interviewee says and does. Does the fact that the applicant left home at fourteen and has been on his own ever since indicate emotional maturity, or inability to face restrictions, or conflict with persons of authority, or exceptional self-reliance?

Interviews need to be recorded so that the basis for decisions can be preserved for later review and evaluation. How should they be recorded? During the interview? By recording devices? Immediately afterward in narrative form? In a combined narrative and check list form? In rating form? What effect does the process of recording have on the interviewer's recollection of the person and on his subsequent interviewing?

Finally, the placement interview is the point in the selection process where all the available information about the applicant is brought together from records, tests, physical examinations, and the individual's own statements. The interpretation of the interviewer's observations is modified by the evidence from these more objective sources and, therefore, the reliability and validity of the interviewer's evaluation is affected by the reliability and validity of all the other selection techniques. A good interviewer can make good placements, but when his information is supplemented by information from additional discriminating selection techniques, his placements are further improved.

## 2. Prediction of Industrial Success from a Standardized Interview

---

Carl Iver Hovland  
E. F. Wonderlic

Reprinted from the *Journal of Applied Psychology*, 1939, 23, 537-546, by permission of the authors and of the American Psychological Association, Inc. The authors describe a systematic interview form consisting of topics dealing with the applicant's work history, family history, social history and personal history. At the end of each of these four sets of questions asked of the applicant are questions the interviewer asks himself concerning the applicant's qualifications. Answers to the latter questions are scored plus or minus and a total score is obtained. Validity and reliability data for the procedure are presented.

The notorious inadequacy of the traditional interview has given rise to improvement in two directions: First, in the development of standardized interviews in which the questions to be asked are carefully prepared in advance; and secondly, in the use during the interview of rating scales to permit more precise evaluations of various personal traits which are not otherwise amenable to measurement. Discussion of these procedures will be found in Bingham and Moore (1). Both have shown considerable promise, but both have limited usefulness. The present study reports an instrument which has been developed to utilize both of these techniques in a single form. This instrument, called the Diagnostic Interviewer's Guide, provides for the obtaining of the necessary information concerning the applicant in a standardized interview and in addition permits a rating by the interviewer of the present capabilities and further potentialities of the applicant as judged by his responses to the questions asked in the interview.

The Diagnostic Interviewer's Guide (hereafter abbreviated D.I.G.) was developed as a part of the selection program of Household Finance Corporation, a large personal loan organization. The positions for which applications were received were principally those of outside representatives doing public contact work. Interviewing for employment in this company is done not only by the Personnel Department at headquarters but by branch managers and supervisors throughout the company. This type of administrative organization suggested the desirability of an interview method which would require a short time for administration and could be used by interviewers with

relatively little training. A standardized interview combined with a system for quantitative recording of the rating of the applicant by the interviewer was developed to meet this need. The other instruments used in the selection procedure, for measuring mental ability, personality, interests and attitudes, will be described elsewhere (e.g.).

+18

DIAGNOSTIC INTERVIEWER'S GUIDE

NAME Harry R. Johnson DATE 8/25/37  
 ADDRESS 812 Cherry St. INTERVIEWER E.F.J.

The interviewer should begin each interview with this statement to himself, "This applicant will impress me according to my past experience with persons who remind me of him. Consequently I must be on my guard against such prejudices which may naturally arise on account of this. I must keep a record of the fact and judge the applicant on the basis of the facts only. The applicant is a blank to me now." (Interviewer should write out information received as answers to the questions in the space left for that purpose.) If extra space is needed use separate sheets of paper. All of this material should be included with the blank itself when returned to the personnel department. The questions which are listed below for the interviewer to ask the applicant are suggestive. Other queries pertinent to the applicant's history will naturally suggest themselves to the interviewer as he contacts the applicant.

Please read special instructions on last page before interviewing.

**WORK HISTORY:**

Interviewer says—

1. "Give me the names of your past employers. Begin with the last or present employer and go backward. Tell me:
  - (a) How you got the job.
  - (b) What you did, and.
  - (c) Why you left.

Smith Hardware Co.  
Job through uncle.  
3 mos. - Counter clerk & delivery boy  
still there

Waited on tables  
Wrote working  
Wrote through  
college

2. How did your previous employers treat you? Fine - no complaints
3. What experience of value did you get from each job? Meeting people
4. Did you do work of such quality that your employer would be glad to recommend you? Yes - Expecting a raise
5. Were you ever criticized for the kind of work you did? Give me some examples of mistakes or failures.  
Once for wasting too much time  
talking with customers
6. Can you give me any example of success in your experience, particularly in handling people?  
Sold large order of goods to hard-to-sell  
customers during spare time. \$5.00 extra commission  
Edited school paper - cleared \$1,500.00
7. What kind of work did you enjoy the most and seem to progress the best in?
  - (a) Mechanical work?
  - (b) Clerical and detail work?
  - (c) Contact work?
  - or (d) Do you know?

+4  
-4

When the interviewer has secured as much information as it is possible for him to get concerning every phase of the applicant's work history, he should ask himself the following questions:

1. What kind of work history does the applicant have?  
(-) Poor - Fair + Good - Excellent (+)
2. Has it been the type of work which has required meeting and handling different types of people? (+) Yes + No (-)
3. Has the applicant indicated ability to work consistently? (+) Yes + No (-)
4. Has the applicant indicated a serious and sincere attitude toward the work he has been doing? (+) Yes + No (-)
5. Has the work been such as to necessitate the development of habits of persistence and aggressiveness? (+) Yes + No (-)
6. Has the work history indicated a capacity for growth? (+) Yes + No (-)
7. Does the work history reveal habits or attitudes which would make it easy for the applicant to adjust himself to the policies and procedures of this company? (+) Yes + No (-)
8. Is this man a good soldier as evidenced by good team-work? (+) Yes + No (-)

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FIG. 1.

**Description of the D.I.G. Blank.** The general construction and lay-out of the D.I.G. blank can be seen from the accompanying illustration (Figure 1) showing the first page of a completely filled-in form. Four pages of questions

cover four general areas of the applicants' background and personal characteristics: (1) Work history, (2) Family history, (3) Social history and (4) Personal history. It will be observed that at the top of each section there are a series of standardized questions which the interviewer asks the applicant. At the bottom are questions which the interviewer asks himself concerning the applicant. The answers are scored plus or minus depending on whether they are prognostic of success or failure on the job.

The type of information obtained in the four sections may be briefly summarized:

*Work History.* The questions in this section are designed to aid the interviewer in determining whether or not the individual has shown the capacity to grow and develop in the work which he has previously done. Information is sought concerning the applicant's ability to analyze critically the tasks assigned to him and to profit by his work experience.

*Family History.* The interviewer here asks questions to reveal whether or not the applicant's training and family background, in terms of social, economic and educational advantages, have been such as to develop traits of personality and character which are desirable from the standpoint of success on the job for which he is applying.

*Social History.* Information is obtained concerning the character of the applicant's social interests. The questions seek primarily to analyze the avocational life of the applicant, but also try to determine the individual's sociability and interest in people. This section is of considerable value in supplementing the information obtained from personality tests.

*Personal History.* The items in this section help to discover the motivational factors in the applicant's make-up. Is the applicant ambitious? Is he capable of hard, continuous work? Does he have a well thought-out goal? There are some of the things that the interviewer can determine on the basis of this section of the Guide.

*Scoring.* At the end of each division, at the bottom of the page, are the questions which the interviewer must ask himself concerning the ability and qualifications of the applicant. The answers which the applicant gives to the questions put to him are the basis on which judgments are made. From the interviewer's judgments the quantitative score is obtained. The questions are worded to control as much as possible the interviewer's subjective opinions and impressions.

In scoring the blank, the (+) or (-) is encircled next to the word "Yes" or "No" at the end of each question on the bottom of the page. For example, in question 2 on the sample page:

2. Has it [the applicant's previous work] been the type of work which has required meeting and handling different types of people? (+) Yes—No (-).

If the interviewer believes the answer is "Yes," the (+) next to the word "Yes" is encircled. If the interviewer feels that he should encircle the word "No," the result would be a negative value for this item. All items are checked in this manner. The plus or minus values were determined on the basis of whether the answers were favorably or unfavorably related to success on the job. Thus, some of the "No" answers carry a positive rating, *e.g.*, Page 3, Question 4:

4. Is he [the applicant] careless on money matters or too heavily in debt?  
(-) Yes—No (+).

The total score for the interview is the algebraic sum of the plus and minus reactions on the eight items of Work History, five items of Family History, twelve items of Social History, and nine items of Personal History. The maximum score which can be obtained is +34, the minimum -34. The nature of the scoring is such that all scores are even numbers (*i.e.*, multiples of two).<sup>1</sup>

The questions on the bottom of each page cannot be answered entirely on the basis of the answers to the formal questions above. On the last page, for example, a question is asked concerning the applicant's frankness. This can be answered solely on the basis of the subjective impression of the interviewer. During the interview a number of reactions which cannot be recorded may hint that the applicant is not completely frank throughout, and consequently, he will be given a (-) score on this item. When a negative answer is given, the interviewer is advised to get additional information on this point, and record the data on the blank.

**Reliability.** An adequate determination of the reliability of such an instrument can only be obtained by repeating. This has not as yet been done on a very extensive scale. On a small sample of twenty-three cases, however, it happened that an individual was interviewed locally by one interviewer and subsequently at headquarters by another. A correlation of .71 between the total scores given by the two interviewers was obtained. This reflects not only the reliability of the instrument but also the agreement of different raters. The reliabilities of the individual sections are relatively low because of the limited number of questions employed. On a sample of one hundred cases reliability of the work history section was .57 (odd-even correlation corrected by Spearman-Brown prophecy formula (4)) and that of the personal history .46. The intercorrelations between these two sections were +.14, a value which suggests considerable independence of the subsections. The sections on family and social history both have reliabilities of only .25. The corrected odd-even correlation for the entire form was .82. This considerably exceeds

<sup>1</sup> This fact accounts for the present apparent discontinuity in the scores used in the tables and figures (*e.g.*, 12-16, 18-22, 24-28, etc.).

typical interview reliabilities (1) and is higher than most rating scales (3). It must also be pointed out that the range of scores is restricted because the D.I.G. was given only to applicants passing the preliminary interview and the tests. This restriction of the range of the sample will of course reduce the correlation (4).

**Validity.** The limited range of individuals to whom the interview is given also makes it difficult to make an adequate determination of validity. The D.I.G. is given as a last step in the selection process and a preliminary interview and psychological test have weeded out a large number of the candidates. Even with this pre-selection, however, considerable predictive value of the Guide is indicated. Data on this point are given in Table 1. Here the

TABLE 1. MEAN SCORES ON FOUR SECTIONS OF D.I.G. AT TIME OF INTERVIEW OF GROUPS (1) STILL ON JOB AND (2) DISMISSED

Groups	Sections					$\sigma M$
	Work History	Family History	Social History	Personal History	Total	
(1) Still on job.....	4.02	3.62	9.24	7.72	24.60	0.56
(2) Dismissed.....	2.94	3.14	8.90	6.35	21.33	0.53
Difference.....						3.27
$\sigma$ diff.....						0.77
Critical Ratio.....						4.25

average scores on the individual sections of the interview and on the entire interview are given (1) for a group of individuals who have subsequently proved successful on the job and have remained with the company and (2) for another group hired at the same time but subsequently discharged. The scores were obtained at the time of the interview before employment. The results were compiled after a period of one year, so that individuals classified as "still on the job" have remained a minimum of twelve months. One hundred individuals are represented in each group. The cases were matched for date of employment, interviewers, supervision, etc. No critical score for the interview had yet been set but the selection of individuals was somewhat affected by their scores on D.I.G. and this served to reduce further the range of cases. Despite this fact, however, reliable differences were obtained in the mean scores on two of the sections (Work History and Personal History) and on the total. The difference in total score has a critical ratio of 4.25. The dismissed group had a lower mean score than the employed group on every section.

Data on another method of testing the validity of the D.I.G. are given in Table 2. Here the scores of 300 individuals who were hired are divided into five categories (0-10, 12-16, 18-22, 24-28, 30-34 incl.). The percentages of the applicants hired in each range who are (1) still on the job, (2) resigned and (3) dismissed are computed. The data indicate there is a progressive increase in the percentage of individuals who are still on the job the higher

TABLE 2. PERCENTAGES OF INDIVIDUALS (1) STILL ON JOB, (2) RESIGNED, AND (3) DISMISSED IN VARIOUS CATEGORIES OF SCORES ON D.I.G.

Classification	Scores on D.I.G.				
	0-10 %	12-16 %	18-22 %	24-28 %	30-34 %
On Job.....	38.9	42.9	47.2	48.6	59.2
Resigned.....	22.2	25.7	29.2	29.4	34.7
Dismissed.....	38.9	31.4	23.6	22.0	6.1
N.....	18	35	89	109	49

the score on the D.I.G. at the time of employment. More striking is the progressive decrease in the percentage of individuals who are dismissed as the scores increase. The percentage of resignations increases with the higher scores as might be expected because of a greater number of alternative opportunities for men with better work histories and personal ability. The data on the relationship between scores and percentages of dismissals are presented graphically in Figure 2.

There are few studies available for comparison with the present results, since, as Symonds has pointed out, interviewing "has not been subjected to experimental scrutiny or statistical validation" (6, p. 477). Clark (2), however, has reported results bearing on the validity of interviews with college students. He found that interviews made it possible to predict semester grades with considerable accuracy. The correlation of the predictions and actual grades was .66 for one interviewer and .73 for another. Much less encouraging are the results of Moss (5) on the use of interviews to predict success in medical schools. By refusing admission to the group rated in the lowest quarter on the basis of an interview, 33 per cent of the failures would be eliminated, but at the same time 23 per cent of those making scholastic averages of 85 or above would be eliminated.

*Training of Interviewers.* After considerable preliminary work a satisfactory procedure for training the managers of the local offices in the technique of interviewing has been developed. A large number of typical inter-

views were microphonically recorded with simultaneous use of the D.I.G. blanks. On the basis of these records sample interviews were printed with accompanying filled-in blanks and distributed to the managers of all local offices. Complete instructions on the use and limitations of the blank and a discussion of interviewing in general were then included in an instructions manual.<sup>2</sup>

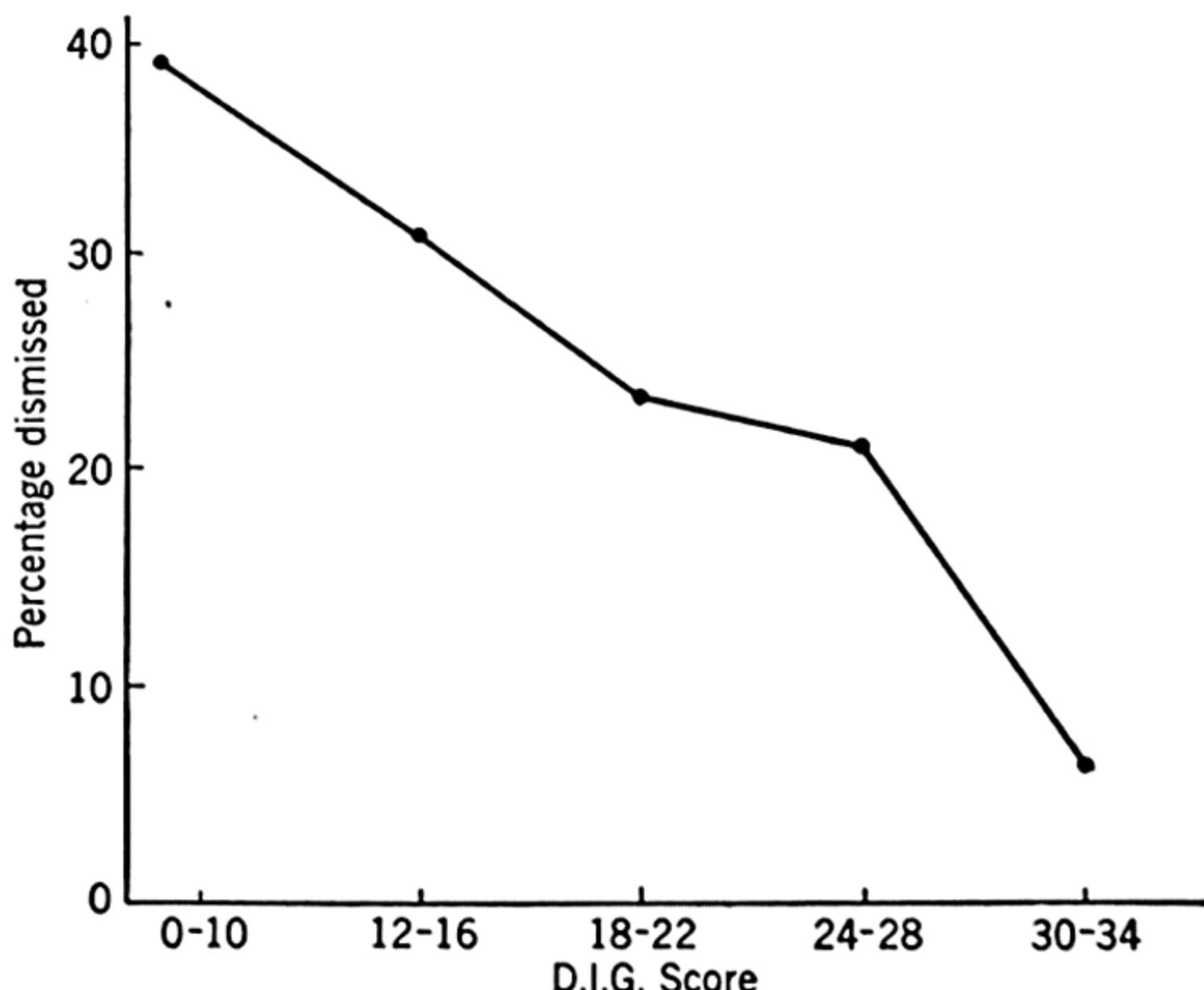


FIG. 2. Percentages of individuals who are dismissed within a year in groups having various Diagnostic Interviewer's Guide scores at time of employment.

*Weighting by Item Analysis.* It appears that the most logical step for future development of the D.I.G. is a weighting of the questions in terms of their discriminative power. Work on this point is now in progress. Results to date indicate that the D.I.G. blank supplements in a very satisfactory way the information obtained from standardized personality and attitude tests. A subsequent study will report these results.

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### 3. Improving Supervision by Reducing Anxiety

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*Richard Wallen*

Reprinted from *Personnel Journal*, 1951, 30, #1, 9-13, by permission of the author and Personnel Journal, Inc. It is the author's contention that the problem of changing a supervisor's behavior is similar to that faced by the therapeutic counselor. This article is primarily concerned with a translation of therapeutic principles into supervisory training methods.

When you organize a program for training executives or supervisors in "human relations" you hope to improve the way they actually deal with people. Too often, however, such a training program has simply taught supervisors to "say the right things" about their jobs. It is fairly easy to change what people say by applying the pressure of social disapproval. It is considerably more difficult to help people change what they do.

This problem is so similar to that faced by the therapeutic counselor that it is worth trying to translate therapeutic principles into supervisory training methods. Any therapist meets the same kind of difficulty—people who can change their words without changing their actions and who sincerely believe they deal effectively with human problems despite the resentment they create everywhere. From a very general point of view, here is what therapists seem to have discovered about changing behavior:

1. Using threats, social pressure, shame, and appeals to pride produces verbal compliance while increasing insecurity, sense of guilt, and resentment. Real improvements in behavior either do not occur or are carried out in a half-hearted way.
2. Decreasing the tensions—usually anxiety—which lead to ineffective social behavior makes for real improvement often with no sense of intentional effort to change. Let us try to develop some supervisory training methods from the standpoint of a therapeutic counselor.

Begin by assuming that much ineffective or harmful supervisory activity stems from the supervisor's efforts to control his anxiety. Of course, this statement is an oversimplification; other and more involved factors may be responsible. Some poor practices probably come from nothing more than lack

of attention to the psychological aspects of supervision. But it is not hard to find supervisory behavior that is clearly the result of anxiety. This kind of behavior is likely to resist your efforts to change it if you resort to lectures, inspiring examples, threats or persuasion. On the other hand, if you could somehow decrease the supervisor's anxiety, it should be fairly easy for him to change his way of dealing with people.

**Poor Supervision Due to Anxiety.** You can illustrate this principle by recalling the difficult supervisory or executive problems that turn up in nearly any survey of management personnel. There are the legalistic martinets who run departments by rule-books, the dependent learners who run to the boss for decisions about trivia, and the fussy snoopers—leaders in unpopularity. Therapeutic experience has shown that these and many other ineffective supervisory behavior patterns have been acquired as techniques for controlling anxiety. (See Cameron (1) for a theoretical formulation of this point.) It is nearly impossible to alter these patterns unless the anxiousness is diminished a little. Fatigue illustrates the point: Irritability due to fatigue does not yield to persuasion nor to lectures pointing out its origin. On the other hand, if you diminish the fatigue, the irritability also decreases.

There are three distinct but interrelated sources of anxiety for the supervisor: (a) personal history; (b) present non-job pressures (e.g., an errant son or unfaithful wife); (c) pressures due to the social structure of his firm and the demands and personal characteristics of his own boss.

The first of these sources includes all those factors in development that predispose people to develop anxiety in particular situations. Competition, hostile impulses, or the presence of "authority figures" may provoke marked anxiety or not, depending upon the personal history. Therapeutic counselors deal mostly with this kind of anxiety in the usual therapeutic interview. Dealing with anxiety aroused by non-job pressures can also be done effectively in the interview. The common methods for diminishing the anxiety include producing a "permissive situation," establishing a close but controlled relationship with the therapist, encouraging a free flow of expression, limiting client-therapist contact to the interview hour, and giving some interpretation of cause-and-effect relationships. These and similar measures usually decrease anxiety enough so that behavior changes can be seen fairly early in the counseling process, although the changes may be limited at first to the interview. The reticent become more talkative, and the belligerent find fewer occasions for insulting the therapist. A good deal of this change is due to the increased sense of security and acceptance which the client feels with one other human being—his counselor. Many of these same measures can be used with conference groups, and a training leader who maintains a therapeutic attitude can decrease anxiety markedly.

The problem of decreasing anxiety from the third source—the social structure of business and industrial firms—probably cannot be solved by direct

therapy with supervisors. It would not help a supervisor to gain insight into the fact that his dictatorial methods result from fear of his boss unless the boss stopped acting in such a way as to produce fear. In most industrial structures each person is continually aware of his boss's preferences and aversions; and supervisors, like all others, do their jobs as defined by the man above them. (Gardner (3) gives a good discussion of "looking up the line.") The boss has real power over his subordinates—power that you cannot nullify by assuming that all supervisory anxiety is "neurotic." The consequence of this power relationship is that even when you have decreased anxiety from other sources, there may still remain a substantial amount due to cruel, capricious, or humiliating treatment by the boss. Since each supervisor's behavior is due in part to the anxiety provoked by his boss, and since the boss is subject to pressure from above, it would appear that we are in an impossible position. The only effective method that seems left is to prescribe psychotherapy for everybody on the board of directors. But things are not quite so bad as that. A case history demonstrating the effect of psychotherapy on an executive has been presented by Eliasberg (2).

The most effective arrangement, then, for changing supervisory behavior rests on two lines of attack:

- a. Decreasing anxiety by altering the behavior and demands of the supervisor's boss. This step is often omitted when training programs are planned, yet it may be more effective than the direct training of supervisors.
- b. Direct conferences with supervisors in which therapeutic methods are used to reduce anxiety and promote insight.

**Outside Consultants Helpful.** The first of these procedures is usually not available to personnel administrators. Even if the personnel man had the necessary training and skill, he could not accomplish much in the way of changing the behavior of other administrators and executives within his organization. His own position as a member of the executive structure would keep him from fitting into a therapist's role. On the other hand, an outside consultant is in a position to be more effective, particularly with executive personnel. He is able to plan his role as a neutral interpreter from the beginning of his contact with the company. Also, he is less likely to be accused of defending a particular group within the company.

In the direct conference work with supervisors, it is possible for a personnel man to use the therapeutic viewpoint. How well he uses it depends upon his own training and his sense of security. If he can accept expressions of resentment and anxiety without feeling threatened himself, he can do an effective job. Without a background in the psychology of personality and methods of psychotherapy, however, the personnel man should not try to depart too widely from his usual methods of supervisory training.

Several practical suggestions may be offered to guide consultants or per-

sonnel men who may be in a position to try a therapeutic method in supervisory training.

### Planning Training Conferences

1. Try to start your training program as near the top of the supervisory structure as you can. For psychological consultants this principle means beginning your work with the executives and then working down through the organization. Diminishing anxiety and the attendant rigidity of behavior among executives will probably bring faster results than at any other level. Some of this work will need to be done individually; some of it can be accomplished in group sessions.

Personnel men who are part of the organization should try to arrange conferences among men a level or two above the first line supervisors. Then, when you are ready to begin training conferences with the supervisors, you will have gained experience. The supervisors will also be more ready to accept the program because of the prestige value attached to the conferences by the participation of their own superiors.

2. In setting up conference plans, keep the various power and status levels in separate groups. Being in the same discussion group with your boss usually results in less freedom of self-expression, even when the boss says he is willing to hear anything. In the later phases of the program, various groups may wish to hold joint discussions. This move is healthy and constructive. It is the beginning of genuine communication between levels of management. But if you begin with a mixture of levels, you will end by changing language without changing action. It seems somewhat safer to have several levels represented in a discussion group comprised of top management, but even here there is a possibility that free expression may be blocked by anxiety over the impression one is making.

3. Be prepared for expressions of anxiety or hostility. Such expressions are signs that your conferences are going well, for only when you are trusted will the real dissatisfactions and bitterness emerge. It is a bad error for you to try, as conference leader, to answer complaints and expressions of resentment. If you will encourage the speaker to explain himself more fully and to help the group understand how he feels, you will find that the needed answers will come either from the group or the complainer himself. People who have been given a completely permissive chance to "blow off steam" often apologize or spontaneously admit their exaggeration.

4. Recognize your own anxiety and its effects. In individual therapeutic work, therapists who become anxious over a client's lack of progress may begin to urge, cross-examine, or even criticize him. Naturally the effectiveness of the therapeutic contact ceases. The free flow of expression is impeded, and the chance for the client to understand his own feelings better is lost. The same thing can happen in therapeutic supervisory training. If you are worried about proving the value of the program, afraid of its outcome or the

possible loss of your own reputation, you may act so as to prevent real insight from developing.

5. Work for free expression and insight rather than for mastery of knowledge. If you take a census of the most common problems which the group meets in the course of every-day work, you can arrange to start each session by a five minute presentation of a problem. The members of the group will take it from there and begin to state their feelings, and offer possible solutions. The leader's job is to encourage, by his manner and remarks, a more complete analysis of the problem in terms of human needs and emotions.

**Getting Discussions Started.** One of the most valuable discussions the writer has ever led among supervisors started with a mental hygiene film. Although it seemed to have little to do with the work of the supervisors, they promptly began to compare their own experiences with the film story.

You do not need to feel that every human relations problem that is discussed needs to be solved. Nor should there be a set sequence of discussion topics arranged in advance. You can only try to be sensitive to the concerns of the people in the group, accepting them as real people with real problems. The valuable acquisitions for the supervisors are flexibility, insight, freedom from defensiveness, and sensitivity to the feelings of others.

Finally, you must not count on getting results too quickly. The first sessions are likely to seem slow and superficial. That is because it takes time for the members of the group to find out what is supposed to happen in the meetings, how much the leader can be trusted, and what the reaction of others in the group will be. Conferences led from a therapeutic viewpoint are rare in industry and supervisors will be understandably suspicious of them. It takes time to structure the situation and to let the group members find out that you mean no harm. This point must be explained to those who must approve such programs at the time they are proposed. While the needs of various groups differ, it is safe to say that six to eight weekly meetings are needed as a minimum.

Actual use of this method indicates that it is superior to the usual lecture plan of supervisory training in human relations. There is nothing wrong in giving a series of talks on psychology to supervisors; but it is wrong to expect that they will improve supervision to any considerable degree. On the other hand, slight decreases in anxiety appear to lead to marked changes for the better in human behavior.

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#### 4. The Hawthorne Plan of Personnel Counseling

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*W. J. Dickson*

Reprinted from the *American Journal of Orthopsychiatry*, 1945, 15, 343-47, by permission of the author and the publisher. A description of the now famous plan of personnel counseling at the Western Electric Company. Every counselor is assigned to a territory comprising 300 employees to whom his entire time is devoted. The interview method is used to bring about adjustments and changes in employee attitudes. The counselor does not take action on grievances, nor does he intercede on behalf of the employee, supervisor or management.

Our personnel counseling program has been set up in our Industrial Relations Branch as a service to our employees and supervisors. At the present time we have forty counselors equally divided between men and women who are assigned to organizations employing 85 per cent of the hourly rated force and 25 per cent of the office force. Men are assigned to men and women to women.

Every counselor is assigned a territory comprising some 300 employees to whom his entire time is devoted. He has no other duties or responsibilities. Each counselor has access to the shops and office locations to which he is assigned and spends a considerable part of each day contacting people while they are at work. This enables them to meet newcomers and to keep in touch with employees whom they have already interviewed.

Their contacts with employees are of two kinds: off the job interviews, and on the job contacts. The off the job interviews are held in an interviewing room where the employee may talk in privacy. Employees may be interviewed as often as seems necessary and there is no time limit to the interviews; they average around an hour and twenty minutes. The on the job contacts take place at the employee's work place, in the aisle, at the drinking fountain, or in the rest rooms. It is largely through these contacts that our counselors keep in touch with the employees and integrate themselves in the work groups.

As we are organized, interviews may be initiated by the counselor, by the supervisor, or by the employee. In all cases permission of the supervisor is obtained before the employee is taken off the job. Average earnings are paid for the time spent with counselors and the interviews are held confidential. Such, in brief, is our counseling plan.

We began this work back in 1936 largely as a result of the experimental

studies which had been carried on at our plant prior to that time. During the years 1928 to 1931 we had interviewed over 20,000 employees. Our work at that time was primarily intended to determine the aspects of the worker's environment. Having made this analysis, our purpose was to take corrective action, where needed, in an effort to remedy deficiencies in policies, practices, and working conditions.

As this work progressed, we became more and more aware of two things. First, frequently the complaint as stated was not the real source of the individual's trouble. Consequently, action based upon the manifest content of the complaint did not assure us that the difficulty would be eliminated. Secondly, our attention was arrested by the observation that, given an opportunity to express themselves freely, many complaints were restated by the employees or disappeared entirely. We also observed that this talking-out process had a beneficial effect upon the individual. It seemed to provide him with a release from tensions and a new zest for work. We had all this as background when we decided to inaugurate our present plan of counseling.

In setting up this program, we decided that the counselors should devote their attention exclusively to bringing about adjustments and changes in employee attitudes through the interviewing method itself. As we saw it, the counselor's role should at all times be that of a neutral party. It was seen that in order to maintain such a role in an industrial situation, the counselor had to be free from all activities which were incompatible with this position. This meant that the counselor should not take action upon complaints or grievances nor should he at any time intercede on behalf of the employee, supervisor, or management. Only in this way could he maintain his role of interviewer and keep himself from becoming entangled in the system of personal relations with which he was dealing.

Having thus defined our objective, we started out experimentally with one counselor in one department. We had no sooner started in this department than our attention was directed by the supervisors to a man whom they regarded as a problem. The man was about 45 years of age with twenty years of service with the company. As a younger man he had progressed rapidly and risen to the rank of supervisor. Then something happened and his course trended downward. When he came to the counselor's attention he had been assigned to the lowest grade of work in the department and was not doing well at it. His supervisor said that they had been concerned with his output and quality of work for a long time and had tried every method they knew for improving him but without results. He had become so nervous they hardly dared approach him for fear he might incur an accident on his machine.

In the interviews, the man seemed very willing to talk although at first he had great difficulty in expressing himself and there were long pauses in the interviews. Briefly, the picture was one of extreme social isolation. He had

no friends or relatives except a brother whom he saw only infrequently. After work he ate his dinner and then locked himself in his room. His medicine cabinet was stocked with all sorts of nostrums and after dosing himself with these he usually went to bed and read detective stories or occasionally drank himself into a stupor.

His locker at work also resembled a small drug store which he drew upon frequently during the day. He said that one of the things which bothered him most was the way his supervisors continually spied on him. Every time he turned around he could see his supervisor staring at him and even when his back was turned he could feel his supervisor's eyes boring a hole in his back. This was the general pattern revealed.

The counselor began interviewing this person daily for about three weeks and then less and less frequently as the need diminished. Within a relatively short period his fears began to diminish, his performance to improve, and he seemed to take a new interest in the people around him. Shortly afterward he improved sufficiently to justify his supervisors in recommending him for a higher grade of work and increase in pay.

Today, six years later, he has married, established a home, risen to a responsible position, and seems to have overcome his former difficulties completely.

I cite this case not only because it illustrates a type of human problem encountered in industry, but also because it reveals the potential power of the interviewing method. Where other approaches had failed, this method had in a relatively short time rehabilitated a person and made him an effective member of society at little cost. Although not brought out in the brief account, it is important to remember that during all of the time the counselor was working with this person, the responsibility for the employee's conduct remained in the supervisor's hands. The interest shown by the supervisors played an important part in his rehabilitation.

Of course cases as extreme as this are in the minority. I feel that one of the distinguishing characteristics of our work is that it is a service for the normal person and we are continually impressed by the need for it among normal people. A list of problems taken from the interviews of two counselors over a recent period of time included the following typical illustrations:

1. An employee who feels that his progress is too slow and who cannot see any chance for further progress in his department.
2. An employee in a group which expects to be transferred soon is disturbed by the insecurity of the situation.
3. A young man who is worried about being drafted.
4. An employee who has been offered a higher paid job elsewhere but cannot decide whether to accept it.
5. A young woman having difficulties with parents over getting married.

6. A man with a neurotic wife.
7. A young woman whose husband has deserted her.
8. Friction with other workers on the job.
9. A woman disturbed by her supervisor's criticism of her work.

I would like to comment briefly on the method of counseling employed. In the interview situation our first objective is to put the employee at ease. We accomplish this principally by being at ease ourselves and occasionally leading the interview during the warming up period. As soon as the employee starts to talk, the interviewer encourages him to continue by an occasional nod of the head and by displaying real interest in what is being said. Occasionally the counselor will restate what the employee has said in order to encourage him to continue his train of thought or reexamine what he has said. These restatements are always addressed to the feeling the employee expresses rather than to the logical content of what he says. The counselor never interrupts, he never argues, he never gives advice. His function is that of a skilled listener and the attitude he displays encourages the employee to talk about anything which may be of importance to him. The counselor, while he listens, is seriously trying to understand what the person is revealing about himself.

A characteristic of this method is that the interview is carried only as far as the employee wishes to carry it. We do not probe nor do we endeavor to cover all of the critical areas in a situation unless he voluntarily leads the conversation into those areas. One of the advantages of this method is that we avoid any implication that the employee is being analyzed. Also I feel that this procedure avoids many of the problems of transference which arise in clinical interviewing and which would be difficult for a layman to handle.

Another characteristic of this method is that we do not try to make a diagnosis or arrive at a logically satisfying explanation of the employee's difficulty. We are afraid that this would lead to probing or to directing the interview. Also we realize that the results of an interview do not really terminate when the interview is finished. The employee may continue his train of thought for a day or two afterward and in this process may reach a solution to his difficulties. If he wishes to tell about what went on in his thinking during such a period, we will be glad to listen. If he does not, it is perfectly all right with us as long as he is satisfied with the conclusions he has reached. Another point that may be made here is that we try not to attach labels to situations because in our experience this leads the counselor to try to fit the person to the classification and thus diverts attention from the employee as an individual.

In applying this method in industry, it cannot be emphasized too strongly that the counselor must at all times avoid becoming involved in any of the evaluational processes in terms of which individuals and groups are appraised, punished, or rewarded. He must relate himself to everyone in the

counseling territory in exactly the same way whether it be an individual worker, a supervisor, or a shop steward. We do not interview an employee and then go and discuss his situation with his supervisor. Instead we attempt to build up an interviewing relationship with the supervisor. If he wishes to talk to us about a particular employee, we encourage him to do so but we do not contribute our knowledge of the individual concerned. In other words, we attempt to interview at each point in the pattern of relations. We feel that through operating in this way adjustments do take place in the interrelations of the people involved.

The function of this kind of interviewing for the individual is probably well understood by most interviewers. I would, however, like to mention some of the benefits as we see them. First of all, this approach provides an emotional release and a relief from tensions. This is noticeable in all cases where the individual is disturbed or upset. It is not unusual for our counselors to have employees tell them that they enjoyed a good night's rest for the first time in weeks following an interview.

Another valuable function of the interview is that it stimulates the employee to reexamine the ideas, beliefs and fantasies which have been built up in his mind. Frequently this process brings about a modification of the interpretations the individual makes of his experiences. It is not unusual, for example, for an employee to start out making extreme accusations of unfairness against a particular individual and at the end of the interview to remark, "Well, I guess he's got his problems too and it's not so bad after all."

There is also considerable evidence that the counselor relationship with the employee is an important stabilizing force. This is most evident in cases where the employee has few friends and has difficulty relating himself to others. We have observed that as the employee learns to relate himself to the counselor, he begins to acquire a social skill which enables him to relate himself to others. As this process develops, the need for the counselor relationship diminishes. Also in situations undergoing rapid change, as they do from time to time in industry, the counselor relationship is frequently the only one which remains unchanged.

In conclusion I wish to mention certain advantages in this kind of a program which may not be immediately apparent. Since the counselor works with an entire group, no special significance attaches to the person who needs the service more than others. This avoids the onus of being labeled as a mental or problem case by supervisors or coworkers. Also the maladjusted person can be dealt with without disrupting his normal routines of living. This is very important when we consider that for most of us our work routines serve as a dominant stabilizing force. Finally, this program enables the counselor to detect disturbances when they first arise and they can be dissipated before serious injury results to the individual or to the organization.

## Part Six: ACCIDENTS AND SAFETY

### 1. Accident-proneness: A Hypothesis

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*Charles A. Drake*

Reprinted from *Character and Personality*, 1940, 8, 335-341, by permission of the author and the Duke University Press. The author proposes a new and specific hypothesis on the perceptual-motor concomitants of accident-proneness. It is hypothesized that individuals with slow perceptual speed relative to their motor speed will be particularly likely to have accidents. Some confirmatory data are presented.

Three years ago the writer reported, in papers presented at a meeting of safety engineers<sup>1</sup> and at a meeting of applied psychologists,<sup>2</sup> respectively, a psychological technique for the detection of accident-prone persons in industrial employment. The reports were suggestive only and intended to stimulate further research along the same lines by others who were more advantageously situated to carry forward such investigations.

Recent inquiries directed to a score of agencies that might be expected to have information on the further research suggested in the papers have failed to disclose any such activity. The replies have also indicated that the original presentations were lacking in certain features needed to make the technique comprehensible by some who might wish to use it. This article is therefore designed to remedy this latter condition and to offer some suggestions for further experimentation.

Four of the tests used in the original battery were planned as the result of a considerable number of job analyses and work observations made in one department of a factory and reported in detail elsewhere.<sup>3</sup> They consisted of two motor manipulation tests and two inspection or visual perception tests. A fifth test, the O'Connor Tweezer Dexterity Test, was added for purposes of comparison, as the other tests were specially designed and still unstandardized.

<sup>1</sup> Greater New York Safety Council, Hotel Astor, April 13, 1937.

<sup>2</sup> American Association of Applied and Professional Psychology, University of Minnesota, Aug. 31, 1937.

<sup>3</sup> *Factory Management and Maintenance*, 1938, 96, 71-78, and *American Machinist*, 1938, 82, 766-768.

All of the tests used were of the "work limit" type, that is, they consisted of a definite number of pieces to be manipulated, while the scores were determined by the times taken to accomplish the tasks set. This method of scoring is in keeping with the practices current in time and motion study work in industry. To facilitate direct comparisons among the several tests, all raw scores were converted into standard scores with a mean of 50 and a standard deviation of 10 on the bases of the distributions of scores made by the several hundred persons tested.

The motor tests involved principally dexterity of the fingers together with some motions of the wrists and arms. The Pin Board required the testee to pick up round pins,  $\frac{1}{8}$  inch in diameter and 2 inches in length, one with each hand, and to place them simultaneously in parallel rows of holes in a large wooden tray. The Right-Right Turning Test involved the turning of ten pairs of machine screws into threaded holes in a vertical steel plate. The O'Connor Test required the testee to work with only one hand in placing small metal pins, with the aid of tweezers, in parallel rows of vertical holes in a wooden block.

The inspection tests were primarily tests of visual perception, but both involved some motor manipulation in handling the parts. The Spiral Test consisted of one hundred small aluminum spirals, each of which had been punched with a small hole near one end. Fifty were punched "standard"—two-and-one-half turns from the end. The remaining fifty were punched "off standard," at distances other than the standard. The testee was required to separate the standard items from the others. The Case Test introduced an additional perceptual operation. One hundred and twenty colored metal pencil cases were to be sorted into six compartments of a tray by colors, but thirty defaced—punch-marked—items were to be detected and placed in a separate compartment.

The experimental group consisted of forty female operators from one metal-working department of the factory selected by the foreman in response to this request: "Some of the best, some of the average, and some of the poorest." The range of scores on each of the several tests indicated that this had been conscientiously done. Cards bearing the names of these forty operators were subsequently handed to this foreman on two different occasions about three weeks apart with the request that he rank these operators in order of efficiency. Each time he arranged the cards without hesitation, his two rankings agreeing .9. We later learned that these rankings had been conditioned by, and agreed very well with, the operators' piece rate earnings.

These 40 operators had 73 accidents during the 17 months covered by the accident records, against 71 accidents recorded for the other 39 operators in this department. Twenty-three of the selected group of 40 operators suffered from one to nine accidents each during the period, against 23 in the remaining group of 39 who had from 1 to 14 accidents each. From this and other

data we concluded that the experimental group was a representative sample.

Since the accidents recorded differed in severity, and since 20 of the 40 operators had been employed less than the 17 months covered by the records, an "accident index" figure was computed for each person by the formula:

$$A.I. = \frac{\text{Number of Accidents times Severity}}{\text{Length of Service in Months}}$$

Average severity was estimated by the registered nurse in charge, using a scale from 1, slight, to 10, very severe. Severity of each accident was largely dependent upon the number of redressings required rather than upon the extent of impairment in working ability. For the 20 operators whose period of service exceeded the 17 months covered by the records, the figure 17 was used in the denominator. A high index figure therefore represents many accidents, or severe accidents, or both.<sup>4</sup>

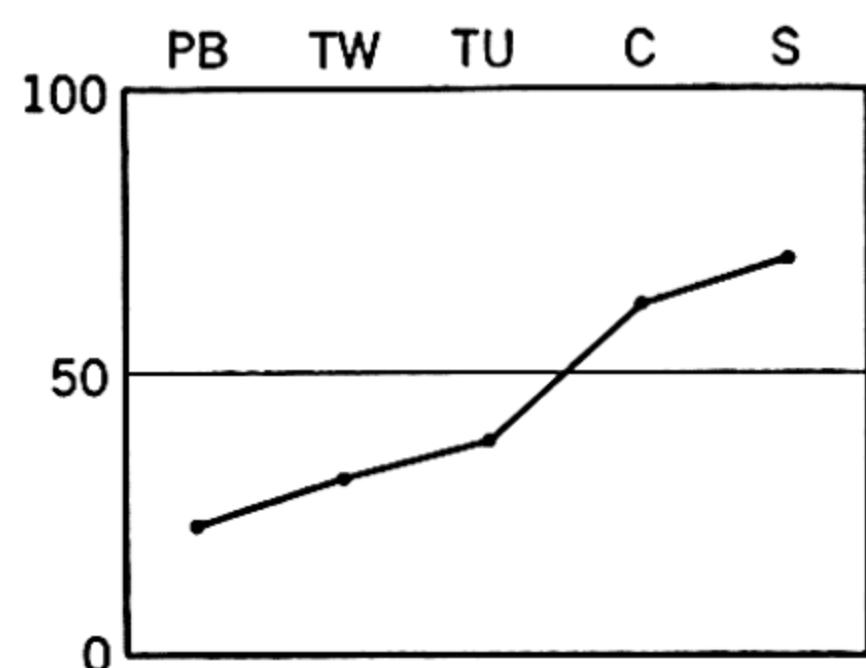


FIG. 1a. The "safe" type; accident index = .00.

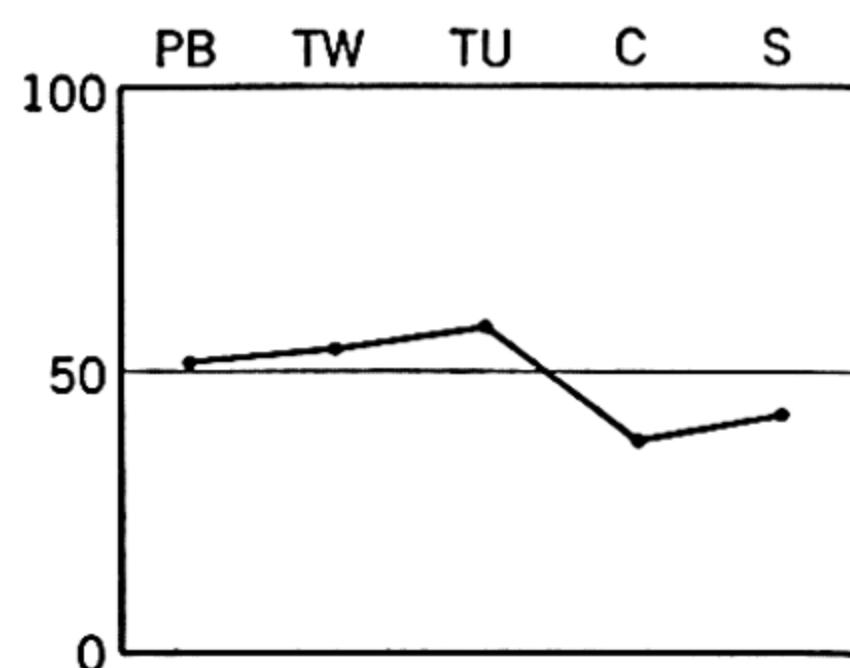


FIG. 1b. The "accident-prone" type; accident index = 1.00.

Systematic statistical and graphical examinations were made of the direct relationships between the accident index and each of the several sets of test scores without arriving at any conclusions of significance. Psychographs, of the type shown in Figures 1a and 1b, were also made for the operators, and the accident index figures were inscribed in the upper right-hand corners.

During a somewhat casual manipulation of these psychograph cards it was observed that the accident index figures tended to be high when the scores on the motor tests were higher than the scores on the perception tests. It was also observed that the accident index figures were low or zero when the scores on the perception tests were higher than the scores on the motor tests (see Figures 1a and 1b).

Following up this promising cue, the numerical scores were again examined in relation to the accident index figures, this time by subtracting each test score from every other test score for that individual and computing the relationships between such differences and the accident index. Computations

<sup>4</sup> A copy of the original data will be supplied to anyone interested upon request.

were also made of the relationships of the differences among various groups of scores and the accident index.

From the foregoing computations it was concluded that the set of differences resulting from the subtraction of the scores on the Right-Right Turning Test from the scores on the Spiral Test exhibited the most significant relationships with the accident index figures. These relationships are shown graphically in Figure 2. The probability that this differentiation is valid and not the result of chance is high.

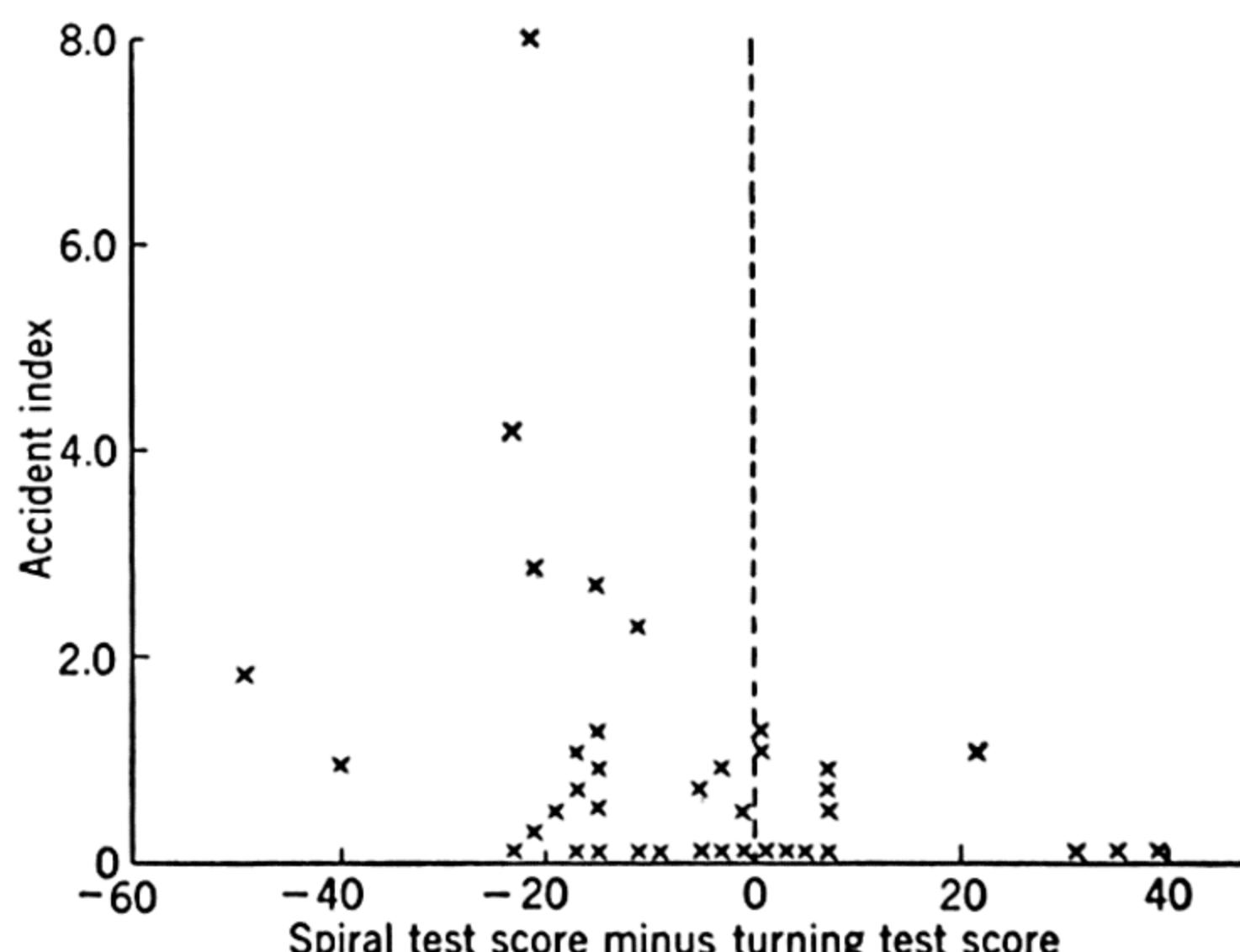


FIG. 2.

The average difference-score for the 17 accident-free persons in the group is  $-2.9$ , with an S.D. of 14.1; for the 23 accident-cases the average difference-score is  $-12.9$ , with an S.D. of 14.6. The difference between these means is 10.00, and, by the usual formula, the S.D. of the difference is 4.5. The difference is therefore 2.2 times its S.D., indicating that the probability is 98.6 out of 100 that the difference is genuine (greater than zero).

A comparison of Figure 2 with similar diagrams on which the scores of each of these two tests are plotted against the accident index, clearly reveals a lack of a significant linear relationship. This probably accounts for the failure of the earlier comparisons to disclose the existing relationships.

That these two tests are measuring quite different abilities may be inferred from a study of the manipulations called for in the performance of the tests and from the low intercorrelation. The latter is of the order .2, as computed from the whole group tested later—operators and applicants. Each gives an approximately normal distribution of scores, ranging from 3.61 minutes to 11.68 minutes for the Spiral Tests, and from 4.42 minutes to 12.31 minutes for the Turning Test, in terms of raw scores. Retest reliabilities are .8 for the former and .9 for the latter, both uncorrected.

It may be inferred that the Spiral Test is measuring visual perception, primarily, and that the Turning Test is measuring a manual or motor speed and control factor. These are not the best tests that can be devised for measuring such factors. The Spiral Test involves too much perception in only two dimensions and too much manipulation, this latter overlapping what is measured by the Turning Test. This latter test involves too much positioning, or fitting of the screws into the plate (to get them started), a factor quite different from the mere turning of the screws, thus not affording a pure measure of the apparently more significant turning ability.

Further research in this field would seem to require several tests of perception in two and three dimensions, uncomplicated by manual and other disturbing factors, and several tests of manual or muscular manipulation, as nearly free from perceptual and other complicating factors as it is possible to devise them. This is on the assumption that the hypothesis herein offered is the one to be investigated.

The hypothesis itself is simple and appeals to common sense: Individuals whose level of muscular reaction is above their level of perception are prone to more frequent and more severe accidents than are those individuals whose muscular reactions are below their perceptual level. In other words, the person who reacts quicker than he can perceive is more likely to have accidents than is the person who can perceive quicker than he can react.

Some very definite support for the hypothesis comes from a study of a group of 18 new employees selected by test for this same department three months after hiring. The reduction in average accident index for this group was 70 per cent, against a predicted reduction of 56 per cent, the discrepancy being probably due to chance variation.

Extensive personnel changes, labor disturbances, and the expiration of the writer's consulting contract with the factory made further prosecution of the study impossible. The promising results of this line of investigation, however, would seem to justify further investigation under more favorable conditions.

The results reported were obtained in a plant that had a highly organized safety program in effect, a program that had already resulted in drastic reductions in the accident records over a period of several years. But repetition of the tests on the same employees after a lapse of weeks and months resulted in scores so close to the ones first recorded that there seemed small hope of changing this apparently innate proneness by any amount of job training or safety education.

It is important to point out the differences between the technique herein reported and that used by the investigators for the British Industrial Fatigue Research Board. The early investigations by Newbold<sup>5</sup> and by Greenwood

<sup>5</sup> Newbold, E. M., A contribution to the study of the human factor in the causation of accidents. *Industrial Fatigue Research Board Report*, 1926, 34.

and Wood,<sup>6</sup> as well as those of Bingham, Slocombe, and others in the United States,<sup>7</sup> point to one conclusion: ". . . some individuals, through possession of certain personal qualities, are unduly liable to accident."<sup>8</sup> Upon this conclusion the experimental work of Farmer and Chambers was predicated.

The latter investigators employed the conventional technique of psychologists, taking a battery of known tests and trying to find significant correlations between the test results and a criterion—in this instance accidents. The three best tests by this technique are reported to be choice reaction time, dotting, and the pursuit meter. All three of these tests make heavy demands upon attention and perception while requiring different types of motor response. The tests combined measurements of perception with measurements of motor manipulation and therefore may have obscured the excellent results that might have been achieved. That is, the impossibility of separating the two factors measured by each test probably vitiated the results.

There are several points concerning the use of coefficients of correlation in such studies that should be noted. A moderate coefficient, of the order of those reported by Farmer and Chambers, often fails to indicate the excellence with which a test may discriminate the cases at the extremes of the distribution. Yet these cases, the very safe and the very highly accident-prone, are the very ones we are most interested in identifying and which seem to be indicated by the technique herein reported.

It may be noted in Figure 2 that of the seventeen cases showing negative scores beyond  $-10$ , fourteen have accident records. Beyond  $-20$  lie eight cases, seven of whom have accident records that include the three highest in the study. The three persons scoring beyond  $-25$  all have accident records, while the three scoring beyond  $+25$  have had no accidents.

The other point is the tendency noted in the British Reports: "Greenwood, Yule, and Newbold have shown that the distribution of accidents is a skew one, yielding a J-shaped curve—so that a high percentage of the total number of accidents in any group are incurred by comparatively few members of the group."<sup>9</sup> Our data show this tendency and suggest, at the same time, that correlations based on the assumption of linearity are inappropriate.

This report has pointed out that accident-proneness probably arises out of a relationship among factors and not out of a single factor. If the hypothesis is correct, the airplane pilot, the bus driver, and the domestic servant are as suitable subjects for investigation as is the factory worker.

<sup>6</sup> Greenwood, M., & Wood, H. M., *The incidence of industrial accidents. I.F.R.B. Report*, 1919, 4.

<sup>7</sup> Bingham, W. V., & Slocombe, C. S., *Individual differences in industrial personnel. Eugenics News*, 1930, 15, and *Personnel Journal*, 6: 7 and 25, 1926.

<sup>8</sup> *I.F.R.B. Report*, 38, iii, Preface.

<sup>9</sup> Farmer, E., & Chambers, E. G., *A study of personal qualities in accident proneness and proficiency. I.F.R.B. Report*, 1929, 55, 59.

There is reason to believe that new investigations, with new and specially designed tests and better records of accidents, will yield striking and valuable results in the detection of accident-prone persons. Suitable measures of control should then be possible.

## 2. Emotional Factors in Accidents

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*Rexford B. Hersey*

Reprinted from *Personnel Journal*, 1936, 15, 59-65, by permission of the author and Personnel Journal, Inc. The underlying theme of this discussion is that safety work, with its emphasis on rules, regulations, slogans and other aids, too often neglects an important aspect of accident prevention—namely, the emotional state and day-to-day adjustments of the individual worker.

Few people realize that the most difficult phase in accident prevention work lies in affecting the union of mental and emotional attitudes toward safety-first work. Formerly the job of the safety engineer was more difficult because he had both elements to overcome. Not only were the emotional factors present which are my topic in this paper, but the mental attitude toward the deliberately safe worker was to regard him as a weakling and a "softy." Today this mental barrier is almost entirely gone.

Workers now consider safety the fourth most important item in their industrial environment, and at the same time the one best carried out by management.

Why then is it often so hard to get them to cooperate day in and day out with a safety program? A certain amount of it comes from the opposition which we always offer to anything which reduces our freedom of action. It is similar in many ways to the common reaction against prohibition. There are, however, other more purely emotional factors which are even more directly responsible.

**Low Emotional States.** The first emotional influence to be noted is that accidents may result from low physical and emotional vigor. During the last seven years I have studied in this country and Germany more than one hundred workers, using the most approved methods of both clinic and laboratory which were applicable. In each case the study lasted from four months to a year. Over 500 cases have been studied less intensively. Only one of them experienced a serious accident, and his accident took place outside of the plant. But of the others, out of over 400 minor accidents, more

than half took place when the worker was in a worried, apprehensive, or some other "low" emotional state. This fact becomes very diagnostic when we bring into the comparison the fact that the total group of workers were emotionally low not more than 20% of the time. This shows that the number of accidents which occurred must have been unduly influenced by the sadness or worry of the individuals.

The foremost evident causes of these low emotional moods were:

- a. Plant worries.
- b. Home difficulties.
- c. Fatigue and lack of sleep.
- d. Periodic emotional disturbances.

One or two illustrations will suffice. A foreman and I were walking through his department. He saw a man standing on a two wheeled cart painting a machine. There was a support under only one end. If he had stepped one foot to his left, this cart would have tripped over. The foreman told him to get a trestle, which he did. Imagine our amazement on returning fifteen minutes later to find him on a ladder which was too short, and which he had placed on a rounded block so that the ladder was apt to slip off at any minute.

The foreman said, "Mike! What in the world is the matter? Look at that block that ladder's on and just after I spoke to you about the cart only ten minutes ago! Do you want to get me in bad?"

"Honest. Boss! I never knowed what I was doin'. My wife tried to commit suicide and I have been worryin' what she's doin' now."

We talked sympathetically for a while and gave him a bit of encouragement before leaving. I observed him carefully without making it obvious most of the rest of day, but saw no further violation of any rule. A very similar incident was observed in the case of another worker worrying about his demotion and subsequent treatment at the hands of the "gang."

Another man had five accidents in six months, every accident taking place after seven o'clock in the evening. He worked from three to eleven. On investigation we found that he went to school in the morning and was getting no more than four hours sleep, which made him nervous and irritable. He would be all right, however, until he had finished his supper in the evening. A sensible rearrangement of his outside activities has made him a no-accident worker for over two years.

**Lack of Sleep.** The home difficulties and plant worries are perhaps more often given as causes of accidents than lack of sleep and the periodic emotional fluctuations. It is true that they are more obvious because a person whose mind is on something else besides his work can certainly not observe the factor of safety as carefully as he should. I have certainly no cause to quarrel with the importance of these items. However, worries often prevent the worker from sleeping properly. This is especially true in the case of

home worries or sickness in the family which forces him to get up repeatedly during the night. As far as I have been able to see, lack of sleep shows rather little effect on efficiency, because a mere moment of complete relaxation in the washroom or even at the machine, after a person has been up most of the night, may help him to turn refreshed to his work. It is this slight moment of almost enforced relaxation or dozing, however, which may be the very time for a serious accident to occur.

The last point which I mentioned as a cause of low physical and emotional vigor, namely, the periodic emotional fluctuations, is the time when accidents usually occurred to about 40% of the workers studied. Now I should like to explain the subject of periodic emotional fluctuations somewhat fully. Every male worker whom I have studied showed the astounding fact that emotional tone varies not only from time to time during the day, but also, for no accountable reason, seems to exhibit longer recurrent fluctuations. Stress may, however, well be laid, at this point, upon the fact that this theory does not mean that every person or even any person will suffer a severe case of the "blues" at regular intervals. It means rather that there will be a lowering of a person's emotional resistance and his capacity for integration and response which may for any definite "low" merely mean that he is less happy than during the "highs" both preceding and following. How acute the depression experienced in the "low" may be, depends not only upon the internal condition of the person but also on his relation to his outer environment. These recurrent emotional fluctuations in the workers studied in America averaged about five or six weeks in length, the time span for two men being only three weeks and for another nine weeks. Once the normal or average time span of the workers was discovered, it was observed that the fluctuation of each period around that norm was no more than a week. That is, if a worker's normal emotional time span was seven weeks, circumstances might speed it up to six weeks or retard its development to eight weeks. Observations disclosed that the span of the younger workers was shorter than that of the older married workers.

**Accidents When Elated.** If these "lows," both incidental and periodic, render us less competent to do our work, and at the same time increase our liability to accidents, is it not logical to think that we should be more able to avoid accidents during the highs? It is true that the positive state of pleasant emotional satisfaction and good physical condition helps to reduce the liability to accidents, but when the elation and physical vigor become too exuberant, as is often the case especially with young workers, not only accidents and their importance, but also the need for security against old age and illness fade into insignificance in the elated worker's mind. At such times it seems as if a superabundance of emotional energy drives the worker to seek satisfaction for his ego by attempting to show his disdain for all restrictions, the safety regulations included. Though the worker and foreman may ordinarily be quite cooperative with the safety regulations and their observance, these

moments of high elation often make the most understanding worker perform some foolish bit of thoughtless action which may cost him a finger or an eye. Roughly about 20% of the observed accidents in the United States occurred when the workers were in such a high state.

Another element which often enters into the worker's behavior during such a vigorous mood is the fact that his good feelings stimulate him to produce at his highest rate of speed. His concentration on output alone makes him less careful than he usually is. Without doubt, the worker who is so engrossed in himself, or in the actual operation which he is performing, that he has no eye for anything else, will prove more likely to suffer from accidents than will that worker who takes time to consider where he is going, what may be under foot, or what the safety rule is governing that particular job. If the worker rushes himself, or if the foreman "drives" him, the result is the same. The careful worker must either see to it that the conditions of his work are safe by pausing from time to time and devoting conscious attention to all the details of his work, including his safety, or else he must be able to do his work to a large extent in an automatic fashion and thus permit his conscious mind to take the factor of safety into consideration as he works.

We have now covered most of the factors which from the emotional standpoint tend to throw a monkey wrench into accident prevention work. I sum them up:

1. The conflict between mental judgment and a deep-down unwillingness to abide by restrictions.
2. The results of low physical and emotional vigor.
3. The contrasting influence of too high spirits.
4. The failure of semi-automatic functioning on the job largely through lack of proper training.
5. Purely outside distraction.

**Individual Approach.** We come now to the methods whereby these emotional factors can be overcome and in part utilized in our accident prevention work. The first approach which I shall use may be termed the individual approach, and the second the collective approach. Naturally, there is no hard and fast line to be drawn between the two. The individual method is rendered necessary by the fact that about 50% of the accidents, both lost time and minor accidents, would seem to be caused by 20% of the workers. My studies have confirmed this point of view, though it must be admitted that a comparative study of the various occupations would give different percentages. Dr. C. S. Slocombe of the Personnel Research Federation, stressed the same thing in an article called "It's a Habit." His survey indicated that in a plant of 6,600 employees, there were 900 chronic repeaters. These men were responsible for 60 per cent of the minor accidents and also for 60 per cent of the lost time accidents. Is it not most necessary

that any sensible program of accident prevention should concentrate itself on these repeating individuals? The major aim of the program should be to cure these men of their accident tendencies or to transfer them to other departments where they would have little opportunity to injure themselves or others.

It is not to be thought that all of these "repeaters" are emotional misfits. With some it is poor training, lack of intelligence to grasp some of the less obvious parts of their work, or some physical deformity or ailment which unfits them for that particular type of job. In one of the railroad shops where I was working Rufe Smith's job was abolished and in accordance with the seniority rule he "bid in" another job. His technical proficiency was sufficient and he was given the job. He had been on it, however, only two days before it was obvious by reason of the awkward manner in which he climbed over the engines that he was an accident risk. The foreman sent him to the medical department for examination, but the physician, who likely had sat in his consultation room the last ten years and hardly knew a machine shop from a blacksmith's shop, returned him fit for duty. Of course his separate organs were, but operating as a unit they did not constitute a body to climb efficiently over engines. The foreman did his best to retrain him; his buddies tried to look out for him, but inside of two months he had three minor accidents and one lost time accident, in which because of a fall one of the bones in his leg was broken. After that I induced him to "bid in" another job, on which he has worked the last three years with only four minor accidents.

**Maladjusted Individuals.** But the emotions do play an important part in the majority of these repeaters' accidents. The man whose emotions are too easily affected, who can be made elated, sad, or angry by the song of a bird, the defeat of his favorite ball team or the joshing remark of a fellow worker is an accident risk. The maladjusted individual who is harboring some grievance relative to either home or plant, or who has some emotional complex that prevents his intelligent grasp of all the factors in his work most of the time is likely to be a "repeater."

One particular truck driver was a "repeater." On investigation it was found that he was imbued with a superiority complex, to give it a common name. When he got in that big truck he felt every one should give way to him. If it were a question of just squeezing past a red light, he answered it by stepping on the gas. This situation was rectified by a goodly portion of judicious explanation, a dash of humor, and dab of threatening.

What, however, should be done about the "repeaters"?

1. See to it that means of identifying them are available, either from dispensary records or otherwise.
2. Bring in all who may be interested or helpful to assist in studying the individual: Foreman, employment manager, doctor, plant psychiatrist, if there is one, workers' representative, etc.

3. Study each case as a psychiatrist does a patient, looking into every factor in his life; past accidents, medical record, plant and family experience, attitudes toward fellow-workers, company and foreman, working habits, inattention, distractibility, clumsiness, intelligence, emotional stability, etc.

4. Draw conclusion as to probable cause and work out remedial measures with cooperation of all concerned.

So much for the first approach to the study of individual cases.

**Mass Methods.** We come now to the collective approach. As it is well known to you all, I shall only mention some essential points, which have proved their worth in practice:

1. Example on the part of the foremen.
2. Education of both workers and foremen.
3. A technically "safe" plant.
4. Repeated inspection.
5. Careful investigation of each accident to eliminate unsafe practices.
6. The holding of the direct supervision responsible, at least for the explanation of every accident in his department.
7. Persistence yet variation in some technique of keeping safety continuously in the workers' and foremen's minds.

Most important of all is the attitude of the immediate supervisor. He must set an example of real interest in safe practices and at the same time must be on the lookout for violation of the safety code. The worker's emotional opposition to "safety" is often in inverse ratio to the length of time a conscientious safety program has been in operation and the bosses proved interest. The foremen must therefore also understand and take into account the importance of the worker's emotional attitude.

It is, however, not sufficient in safety work to put before both supervisor and worker merely the ideal of benefits to be derived from not having accidents. The mule requires not only the hay before his nose. The whip diplomatically administered is also necessary. From the emotional standpoint it is necessary to set up an emotional urge wherein greater discomfort follows failure to obey safety rules than satisfaction from flaunting them. To make this policy most effective, the direct supervisor must, therefore, be held responsible not only for accidents incurred by workers under his supervision, but also for infringements of the safety regulations, though such infringements do not lead to actual accidents.

Naturally this utilization of the penalty idea must be made with caution. Otherwise, it will defeat its own end by setting up particularly in the worker's mind an emotional tension which will tend to cause accidents rather than prevent them. If, for instance, the idea gets abroad in a plant that two accidents will cause a man to be fired, the result will be worse instead of better. If, however, in the dim background of the worker's or the supervisor's

mind there exists the knowledge that every accident or even every violation of a safety rule will demand discomfort and tedious explanation, the result can only be good. This does not mean that flagrant violation of the rules should not be visited with some punishment, but certainly the threat of discharge should never be made an open and commonly used method of coercion.

**Rewards and Penalties.** Let me sum up. Fundamentally there is something in human nature which rebels at the idea of continually being safe. Accidents result largely from a lessening of the power of integration which may come from either unhappy emotion such as worry and fear, or from too high emotion such as elation and undue exhilaration. These emotions may result from very pleasant happenings, periodic emotional fluctuations, home difficulties, lack of sleep, fatigue, or plant worries. Causes of accidents, only indirectly connected with the emotions, are (1) the worker's failure, through improper training, to function sufficiently automatically on the job to overcome the direct emotional difficulties and (2) distractions—which may even result from too great attention paid to certain parts of the job to the detriment of the safety factors necessary.

Closely connected with these more general emotional factors which apply to most workers come the personality factors which are a part of a man's emotional make-up and which cause the largest percentage of accidents to happen to those workers whom we may call "repeaters."

In attempting to overcome these emotional factors we have two methods of approach, the individual and the collective. No safety work can achieve its ultimate goal unless it uses both of these methods. Safety work must therefore offer to the worker both a reward and a penalty, both of them appearing as a part of a just and well balanced personnel program.

### 3. Accident Proneness of Factory Departments

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Willard A. Kerr

Reprinted from *Journal of Applied Psychology*, 1950, 34, 167-170, by permission of the author and of The American Psychological Association, Inc. A statistical study of accident severity and frequency which points to the conclusion that increased attention should be directed toward an enlivening of the psychological work environment, particularly with reference to provision of more and more emotional reward goals as incentives to raise the average level of alertness.

The extent to which individual accident proneness exists or has been a determinant of physical casualties in industry plainly has been exaggerated by many earlier authoritative writers according to more recent evidence (3, 7). Much factory data which appear at first examination to indicate that certain employees are persistent "repeaters" and therefore "accident prone" fail to substantiate such conclusion upon detailed probability study. Accidents distributed by chance (under the theory that a certain approximate number are inevitable under the existing total work situation in a factory department) will supply some workers with no accidents, some with one, some two, and a few with even three or more (7). Because such analysis actually does succeed in most factory experience in explaining much of the individual employee "repeat" accidents data, the time-honored approach of the psychologist and psychiatrist (4) which emphasizes identification of subtle personality conditions which predispose to accidents by some employees seems to be a less promising approach than that which emphasizes study of the total psychological climate in which the typical employee of a group works. If proneness (or liability) to accidents exists such tendency may be a group psychological phenomenon as well as an individual psychological phenomenon.

The fact that intelligent safety engineers and industrial training personnel working with individuals and equipment often are unable to take some factory departments out of the "accident prone" column even after years of intense effort is proof that many group (as well as individual) psychological conditions may be operating.

**The Present Study.** Subjects for this study were 53 accident prone and non-accident prone departments in the Camden Works of RCA involving 12,060

employees. These data were collected in 1943. Forty other variables were investigated in each department.

Accidents per hundred workers per year for these departments ranged from 0.0 to 22.7, although 38 of the departments had rates of less than four accidents per 100 workers. Severity ratings, based largely on days lost from work, also were obtained for each department with the advice of the plant safety director. These severity values ranged from 0 to 75.

It is only because of the grave importance of the objective that such unpromising potential correlates of accidents as some of these reported in this study were investigated. Of the forty variables studied only a few were significantly related to accidents, as expected, yet at least two of these results have not been reported previously in accident literature; therefore, they may justify the entire investigation.

Because both accident variable distributions were positively skewed and several of the variables studied consisted of dichotomous or two-interval data, the tetrachoric coefficient of correlation (2) was employed. The statistically significant correlations (five per cent level) in Table 1 are indicated according to use of Kelley's reliability formula (6) and the Guilford-Lyons tables (5).

Inspection of these significant correlations reveals that accidents tend to occur with greatest frequency in those factory departments with lowest intra-company transfer mobility rates, smallest per cent of employees who are female and on salary, least promotion probability for typical employee, and highest mean noise level.

While departments highest in accident frequency usually also are above average in accident severity, the severe accident departments have some systematic characteristics which are found less often in the high accident departments. High severity departments are heavily male in sex ratio for salary as well as production personnel; they are low in mean promotion probability, low in fertility of suggestion field, low in employee suggestions contributed, high (relatively) in average employee age level, and higher in average employee tenure.

Most of these correlations undoubtedly are artifactual rather than causal in significance. However, a few are worthy of further study and interpretation. Possibly substantial intra-company transfer mobility makes employees more alert and interested in their work environment, resulting in fewer accidents. The cross-fertilization of ideas which probably accompanies intra-plant mobility may act also to reduce accident hazards and promote positive co-operation with safety personnel.

The tendency for departments lowest in promotional probability to be high in both accident severity and frequency may be of considerable psychological significance. It is plausible that when promotion is too unlikely, the *typical*

TABLE 1. CORRELATIONS BETWEEN THE FREQUENCY AND SEVERITY OF ACCIDENTS IN 53 FACTORY DEPARTMENTS AND EACH OF 40 OTHER VARIABLES IN A LARGE NEW JERSEY FACTORY \*

Variable	Accident Frequency	Accident Severity
1. Number of production employees.....	.36	.16
2. Total employees.....	.18	-.12
3. Per cent of employees who are male, production.....	.24	.63
4. Per cent of employees who are male, salary.....	.20	.50
5. Per cent of employees who are production workers.....	.28	.15
6. Production employees per supervisor.....	.16	.08
7. Mean hours worked per week per production male.....	.12	-.29
8. Mean hours worked per week per production female.....	.20	-.20
9. Mean base pay of production males.....	-.07	.22
10. Mean base pay of production females.....	.07	-.18
11. Sex hours differential, mean.....	.24	-.28
12. Sex wage differential, mean.....	-.31	-.14
13. Intra-company transfer mobility.....	-.44	.28
14. Sex-ratio imbalance.....	.21	.51
15. Gross turnover rate (including accessions).....	-.12	-.30
16. Avoidable turnover rate (including accessions).....	-.06	.02
17. Avoidable separation rate.....	-.12	-.30
18. Per cent of employees who are salaried male.....	-.16	.20
19. Per cent of employees who are salaried female.....	-.40	.13
20. Per cent membership in company athletic association.....	-.08	.05
21. Accident frequency.....	xx	.64
22. Accident severity.....	.64	xx
23. Efficiency (plant manager rating, three-month period).....	.06	-.21
24. Efficiency (mean rating of ten competent judges).....	-.09	.16
25. Mean job security (mean rating of twelve competent judges).....	-.05	.02
26. Mean supervisory quality (mean rating, twelve judges).....	-.22	.08
27. Mean job prestige (mean rating, twelve judges).....	-.30	.03
28. Mean promotion probability (mean rating, twelve judges).....	-.40	-.50
29. Mean job monotony (mean rating, twelve judges).....	.13	.03
30. Degree of completion of work (rating, suggestions supervisor).....	-.07	.05
31. Fertility of suggestion field (rating, suggestions supervisor).....	-.11	-.17
32. Suggestion quota (established by suggestions supervisor).....	.20	.12
33. Total suggestions submitted.....	.00	-.40
34. Per cent of suggestion quota met.....	-.37	-.54
35. Per cent of suggestions adopted.....	.12	.16
36. Wage incentive system.....	.00	-.35
37. Mean noise level.....	.42	.13
38. Labor-management mean morale rating (mean of 39 and 40).....	.00	-.40
39. Morale as rated by personnel manager.....	.17	-.36
40. Morale as rated by union local officers (pres. and vice-pres.).....	-.23	-.35
41. Youthfulness of employees (per cent under 26).....	-.37	-.57
42. Tenure (per cent employed more than twelve months).....	.36	.55

\* Coefficients in italics are statistically significant at the five per cent level or better.

employee may develop accident prone *attitudes of relative indifference to the work environment*. A reasonable chance to get ahead may constitute an incentive which not only stimulates the employee to do better work but may make him more alert to avoid hazards which may detain him in his progress.

Accident prone departments usually have above average noise levels. Whether the noise level is causal of accidents or merely an incidental correlate of hazardous factory operations is not entirely clear; it appears to be both causal and incidental. Certainly the reduction of excessive noise levels whenever such reduction is practicable can be expected to do more good than harm as regards accident records.

The pattern of correlates of accident severity is somewhat different from that of accident frequency. As might be expected, maleness is a marked characteristic of severe accident departments; probably females are rarely placed on the most dangerous jobs or in the most "strenuous" departments. Also, male employees tend to be older; Chaney and Hanna (1) found that the probability of fatal or disabling results is greater among older than among younger accident cases.

Less easily explained, however, is the fact that severe accident departments are units which tend to show a poor performance in contributing to the plant suggestion system. Superficially, it appears that departments which lag in making constructive suggestions through the employee suggestion boxes lag also in correcting dangerous conditions and in passing tips around on how not to get hurt; the superficial interpretation easily may be the valid one.

Another tenable hypothesis is that the average "foresight factor" of intelligence is lower in the severe accident departments because foresighted employees tend to avoid or transfer away from dangerous work departments. A third hypothesis, also possibly tenable, is that severe accident departments are those which have been so highly systematized and perfected from the industrial engineering standpoint that the average worker feels no incentive to try to improve the work or workplace through either employee suggestion boxes or alertness to unexpected hazards. While this latter hypothesis is improbable, it does seem highly significant that departments which are high in suggestion fertility are low in accident severity.

**A New Frame of Reference for Safety Promotion.** Perhaps, as some of the correlations in this study seem to suggest, a fundamental change in the total psychological frame of reference in which the *average* employee works is the basic key to reduction of industrial accidents. *This probably can produce the probability that fewer total accidents will happen.*

A psychological work environment that rewards the worker emotionally for being alert, for seeking to contribute constructive suggestions, for passing a tip to a co-worker on how best to do something or how not to get hurt appears from this research to be a profitable goal to work toward. Creating or promoting such an environment undoubtedly calls for a much broader

perspective of approach to accidents than has hitherto been considered by most managements.

An additional item of circumstantial proof that that which promotes alertness also tends usually to minimize accidents is the fact in this study that the departments with incentive-pay systems have no more accidents than other departments. Approximately half of the departments studied are on incentive systems. These same departments are "problem" departments in many respects (higher turnover, more monotonous work, less job prestige, and less promotion probability.) In fact, they have almost all undesirable characteristics except accidents in greater quantity than do the non-incentive departments. The "normal expectancy" record as regards accidents in incentive departments practically is in defiance of physical and even some psychological work conditions. Even though incentive systems rarely succeed as much as they theoretically should in motivating the worker, they nevertheless appear to make him more alert to attain a reasonable productive goal and this alertness apparently makes him safer in his operations. These observations on incentive systems are, of course, somewhat speculative. However, the need for providing emotional rewards for alertness seems highly probable from this research. Such rewards held as attainable goals by workers in "dead end" jobs should operate to raise the average level of alertness, not just to hazards but to everything.

#### SUMMARY

Accident severity and frequency were correlated with each of forty other variables in the 53 departments of an electronics factory.

1. Accident frequency is associated with low intracompany transfer mobility, small per cent of employees who are female and on salary, low promotion probability, and high noise level.
2. Accident severity is associated with predominant maleness, low promotion probability, low fertility of suggestion field, low suggestions record, non-youthfulness of employees, and high average tenure of workers.
3. A common explanatory factor among the accident frequency correlates appears to be depressants to alertness. The same factor appears to be present in most of the severity correlates.
4. Industry should direct increased attention toward enlivening of the psychological work environment, particularly with reference to provision of more and more emotional reward goals as incentives to raise the average level of alertness.

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#### 4. A Re-examination of the Accident Proneness Concept

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Reprinted from the *Journal of Applied Psychology*, 1949, 33, 195-211, by permission of the authors and of the American Psychological Association, Inc. A technical but important paper which shows that accident records do not necessarily represent different degrees of accident liability. A method for analysis of the variances of accident records of people into two component variances is suggested, one component attributable to differences in accident liability, the other to unpredictable "chance factors."

It is generally accepted that certain individuals consistently have many accidents while others do not. This is commonly known as the principle of accident proneness. A critical examination of the data reported in the literature points to the desirability of reconsidering the significance attached to the principle of accident proneness.

This article has two objectives: (1) To indicate that one of the methods to substantiate the principle of accident proneness is unsound and to show that its use has led in some instances to exaggerated views of differences in accident proneness; and (2) To propose a method whereby quantitative estimates of differences in accident liability<sup>1</sup> may be obtained and to point out the conditions when it may be used.

The statistical evidence for the principle of accident proneness was pre-

<sup>1</sup> In the subsequent discussions we shall use the expression "accident proneness" in referring to personal characteristics of people contributing to the likelihood of their having accidents. The expression "accident liability" will refer to both personal characteristics and stable environmental conditions contributing to accidents records.

sented by Greenwood and Woods (6) in 1919. These authors compared the distribution of accidents in a given population with a simple chance distribution for the same number of accidents in a population of the same size. Evidence of differences in accident proneness was obtained: It was discovered that more people had no accidents than might have been expected "by chance." Conversely, it was discovered that more people had many accidents than would have been expected in accordance with a simple chance distribution. In other words, Greenwood and Woods demonstrated that the obtained distributions of accidents differed significantly from chance expectancy. Furthermore, they showed that most of their distributions agreed with theoretically computed distributions based on the assumption that people differed from each other in their likelihood to have accidents.

Newbold (9) further investigated this problem and pointed out that the differences in accident liabilities could not be entirely explained simply in terms of different job hazards. In addition, Newbold, in some of her work, compared the accident rates for the same people in two successive periods and reported that significant correlations existed.

Both Greenwood and Woods, and Newbold were primarily interested in the establishment of the existence of a difference between accident records and chance expectancy. In this they were successful and accordingly the principle of accident proneness was established.

However, another method has been used to support the principle of accident proneness. A number of investigators and writers of books on industrial psychology have pointed out that small percentages of people have large percentages of accidents and have presented data accordingly. In this method the obtained accident distribution is presented as evidence for the principle of accident proneness without a comparison to the distribution that would be normally expected "by chance," *i.e.*, if all individuals were equally liable to accidents. This method is fallacious.

**The Method of Percentages.** The method of percentages of people and accidents implies an incorrect assumption, *viz.*, that chance expectation requires that all people in a population should have the same number of accidents. This is not the case. An obvious limitation that has often been overlooked is the fact that very often the reported total number of accidents in a population is smaller than the number of people in the population. For example, if a group of one hundred factory workers had fifty accidents in one year, then a maximum of fifty people could have contributed to the accident record and accordingly a maximum of 50% of the population would have contributed to 100% of the accidents. Obviously a small percentage of the population in this case does not establish the principle of accident proneness. However, the number of employees having accidents is almost certain to be less than fifty since there is no reason to believe that each one should have had only one accident. Such an assumption would imply that an accident

immunizes its victim against further accidents. If one makes the assumption of equal liability, the people who had one accident should be just as liable to have future accidents as those who have not had any. Thus if accident liability is unchanged by accidents already had, some people should have two accidents before others have had any. In fact, in accordance with chance expectancy some people should have had three or more accidents before another had a single accident. In dealing a deck of cards it is not improbable that a person will receive more or less than the three or four cards in a suit that seem to be his share. He may get six, seven or more such cards without any laws of probability being violated. Similarly, a person may have more accidents than seems to be his share in a given population without being more accident prone than the average.

Thus the assumption of equal accident liability results in different accident totals for the individuals within the group. The resulting distribution can be readily derived from the statement, "the current rate at which accidents occur per person is identical in groups of people with different numbers of accidents in the past." It follows directly from this statement that as the number of people who have had no accidents decreases, fewer people are likely to have first accidents per unit of time; as the number of people who have had first accidents increases, the rate of occurrence of second accidents increases proportionately. These and other similar statements can be reformulated as a set of differential equations, and the solution of this set of equations gives the terms of the Poisson distribution. Greenwood and Yule (7) first demonstrated its applicability to the accident problem. The Poisson is a discrete distribution rather than a continuous one. As applied to the accident problem, its consecutive terms give the predicted numbers of people who had no accidents, one accident, two accidents, etc. The terms are  $Ne^{-m}$ ,  $Ne^{-m}m$ ,  $N-e^m \frac{m^2}{2!}$ ,  $Ne^{-m} \frac{m^3}{3!}$ , etc., where  $N$  is the number of people,  $e$  is the constant 2.71828 · · ·,  $m$  is the mean number of accidents per person.

A number of sets of data will now be discussed in order to illustrate the inadequacy of the method of percentages of people and accidents.

Based upon original records obtained by the authors from a foundry it was found that 1.8% of the 280 men in the day shift had 11.4% of the accidents; 10% of the men had 44.3% of the accidents. In the night shift 5.8% of the 120 men had 12.5% of the accidents and 37.5% of the men had all of the accidents. A computation of the distribution of accidents in accordance with chance expectancy (equal liability distribution) indicated that the differences between the obtained and expected distributions were not significant. In accordance with the theoretical distribution, 1.4% of the people should have had 8.3% of the accidents and 8.9% of the people should have had 38.8% of the accidents. These percentages obtained from a theoretically computed equal liability distribution show that the accident distribution

actually obtained is in accordance with chance expectancy and does not establish the existence of accident proneness.

A study that is often referred to in discussions of accident proneness is that of the National Association of Taxicab Owners and the Metropolitan Life Insurance Company (11). These data deal with the records of 1294 drivers employed by several taxicab companies. Viteles (13) states that "the incidence of accident proneness in the operation of motor vehicles has been well demonstrated in this study." "It is interesting to note that the data obtained in

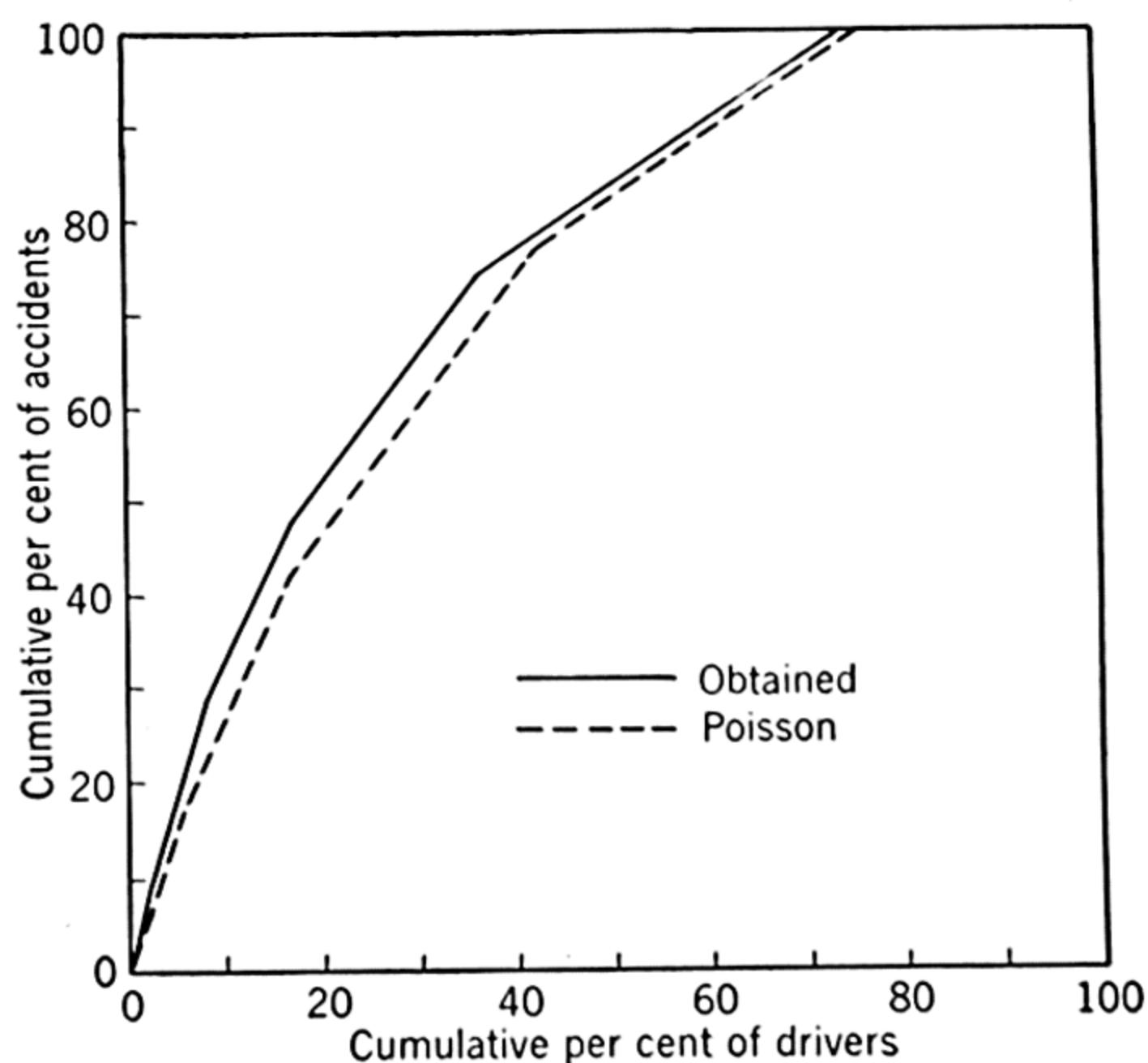


FIG. 1. Relationship between cumulative percentage of taxi drivers and of accidents.

accident prone studies in other types of industries if plotted would closely conform to the curve shown. . . ."

Neither the authors of the report nor the author of the textbook compared the data with the simple chance distribution. Such computations have been made and are presented in Figure 1.

The solid line in the figure represents the cumulative percentages of accidents corresponding to cumulative percentages of drivers, based on the data as quoted in the original report. The dotted line represents the corresponding cumulative percentages from an equal liability distribution.

The two lines are obviously very similar in shape. The argument (13) could be repeated verbatim with percentages from the chance distribution substituted for obtained percentages, with very little loss in apparent persuasiveness. In the chance distribution, 23.5% of the people would have had no accidents instead of the obtained 25.2%. The best and the worst 50% would have had 18.3% and 81.7% of the accidents respectively, instead of the actually obtained 17.2% and 82.8%. The worst third of the drivers would

have had 63.9% of the accidents (instead of 69.3%); the worst 10% would have had 24.7% instead of 31.9% of the accidents.

In spite of the fact that the two distributions are very similar in shape, the difference between them is statistically significant, the chi square being 122.77 (d.f. = 6,  $P < .0001$ ). In other words, factors other than so called chance factors are definitely present but do not markedly change the general shape of the chance distribution.

Another often referred to study on accident proneness is the one reported by Slocombe and Brakeman (12). Their data are based upon accident records of 2300 men employed by the Boston Elevated Railway Company.

In discussing their data as indicative of differences in accident proneness, Slocombe and Brakeman classified the men with four or less accidents as "low accident men" and those with five or more accidents as "high accident men." This arbitrary division placed 1828 men in the first category and 472 men in the latter division. The "low accident" men averaged 2.1 accidents while the "high accident" men averaged 7 accidents. Slocombe and Brakeman did not compute the chance expectancy of the number of men having four accidents or less. Actually, in a simple chance distribution, 1824 men should be expected to be in this category and so only four more men of the total 2300 are in the "low accident" group than obtained by chance. According to chance expectancy, the "low accident" and "high accident" men should have averaged 2.4 accidents per man and 5.8 accidents per man respectively. The difference is not much smaller than the one actually obtained. This does not mean that there is no evidence for differences in accident proneness in the data. It merely means that Slocombe and Brakeman's line of argumentation is inconclusive.

More recent data based upon a random sample of licensed drivers in the state of Connecticut (2) have been analyzed by Cobb (1). He computed the amount by which the variance of accident records exceeds the variance of the Poisson distribution and thus determined that these accidents records cannot correlate with a perfect test of accident proneness to a degree higher than +.44.

DeSilva (2) refers to these data and uses as argument for the principle of accident proneness mainly the fact that four per cent of the drivers were responsible for 36% of the accidents. In a simple chance distribution 2.4% of the drivers would be responsible for 21.2% of the accidents. Again a comparison of percentages of people and of accidents is inconclusive. The figures just quoted based on the assumption of a simple chance distribution look almost as impressive as the figures in the actually obtained distribution.<sup>2</sup>

<sup>2</sup> Tables 1 (Foundry Data), 2 (Taxicab), 3 (Street Car Drivers), 4 (Auto Drivers), 7 (Newbold's Data), and 9 (Conn. car drivers) have been deposited with the American Documentation Institute to reduce printing costs. For these

**Quantitative Estimate of Differences in Accident Liability.** It is possible to arrive at an estimate of the magnitude of differences in accident liability (as distinguished from differences in accident records) in the case of many populations. The procedure has been previously used by Cobb (1) as a step in estimating the maximum correlation between accident records and psychological tests. This procedure can be used in many instances to estimate the magnitude of differences in accident liability, but it is also necessary to mention that this procedure is not universally applicable.

The presence of differences in accident liability of individuals in a population results in a composite of Poisson distributions of the accident records. The reason for this is as follows: Each particular degree of accident liability present in a population should result in a Poisson distribution of the accident records. When two or more degrees of accident liability are present the resulting distribution is the sum of the two or more corresponding Poisson distributions. If the distribution of accident liability is a continuous function the resulting probability function of accidents is a composite of Poisson distribution which can be determined by integration.

When a given distribution of accident records is found to conform closely to a composite of Poisson distributions the evidence is consistent with the assumption that the differences between the accident records of different people are due partly to differences in their accident liability and partly to "chance" factors not predictable in terms of knowledge of the people or of their accident records. In this assumption, the "chance" factors produce the variability within the constituent Poisson distributions while the differences in accident liability are responsible for the differences between their means. In accordance with such an assumption, one may analyze the obtained variance of a set of accident records into two constituent variances and view one of them as representing the operation of the "chance" factors, the other as characterizing the differences in accident liability. The former is the weighted arithmetic average of the variances of the Poisson distributions. As Cobb has shown, its value can be readily estimated as equal to the mean number of accidents per person.<sup>3</sup> Thus the residual variance representing the operation of differences in accident liability may be estimated if one subtracts the mean number of accidents per person from the obtained variance of accident records. We have performed this computation for a considerable number of accident

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<sup>3</sup> This follows from the fact that in a simple Poisson distribution the variance is always equal to the mean. Hence, in a composite of such distributions, the mean of the variances is equal to the mean of the means.

distributions and have expressed the resulting variances attributable to unequal accident liabilities as percentages of the corresponding total variances of accident records.

The argument of the last paragraph pre-supposes that the obtained accident distribution approximates a composite Poisson distribution. Theoretically, an infinite variety of such distributions could be computed, depending on the assumed form of the distribution of the means of the Poisson distributions. Actually only one kind of such composites seems to have been used in research, *viz.*, Greenwood and Yule's (7) "unequal liability distribution" ("UD"). This distribution is based on the assumption that accident liability of people is distributed along a Pearson Type III curve, a continuous skewed unimodal curve. Its equation may be found in several sources, *e.g.* (3), (8). Many sets of accident data can be actually approximated by composite Poisson distributions based on such assumed distributions of accident liability. It should be noted however, that Greenwood and Yule's "UD" distribution is by no means the only possible unequal liability (composite Poisson) distribution. Greenwood and Yule (7) report a set of equations for a different type of Composite Poisson distribution, based on the assumption that accident liability is normally distributed. This distribution does not seem to have been used in research. The possibility should not be overlooked that this distribution or still another composite Poisson distribution, based on some other assumed distribution of accident liability, might prove to be useful in research. In this paper, composite Poisson distributions based on the Pearson III curve were used most of the time. In a few instances another possibility was explored to some extent; some sets of data suggested discontinuous distributions of accident liability, the discontinuity being due to the presence of small numbers of deviant individuals. On the other hand, the presented analysis of the sample variance into two components is not legitimate if the obtained distribution deviates significantly from any composite Poisson distribution.

The line of reasoning just developed will now be applied to the more widely known studies of accident proneness.

The Greenwood and Woods study (6) presents fourteen sets of data. The majority of their findings agree rather well with the composite Poisson distributions computed according to Greenwood and Yule (7). In other words, the obtained figures are in accord with the assumptions:

1. Accident proneness varies from person to person and its distribution is represented by a unimodal continuous skewed curve known as Pearson type III.
2. Accident proneness of a person is unaltered by accidents he may have.

Twelve of the fourteen sets of data do not differ significantly from the corresponding theoretically computed figures. The *P*'s reported by Greenwood and Woods obtained from the chi square technique range from 0.15

to 0.93.<sup>4</sup> The sum of the chi squares for these 12 sets of data, based upon our computations, is 35.33, which for 30 degrees of freedom results in a *P* equal to about .23. The two deviant distributions will be discussed later.

Thus it is possible to approximate closely the majority of Greenwood and Woods' tables by theoretically computed distributions based on the assumptions that accident proneness is constant for each person and distributed in different people in accordance with a Pearson III curve. This finding is one of the principal ones in favor of the existence of differences in accident proneness.

How large then are these differences in accident proneness if we take the findings at their face value and assume that variations in "chance" and differences in accident proneness are the only factors accounting for these distributions of accident records. Table 5 presents the data pertaining to the relative size of these differences in the Greenwood and Woods study.

TABLE 5. PERCENTAGES OF VARIANCE ATTRIBUTABLE TO DIFFERENCES IN ACCIDENT LIABILITY, FROM GREENWOOD AND WOODS' ORIGINAL DATA

Greenwood and Woods' Table No.	Number of Cases	Mean ( <i>m</i> )	Obtained Variance ( <i>m</i> <sub>2</sub> ')	$\frac{m_2' - m}{m_2'} \times 100$
I (A)	750	0.576	0.540	..
I (B)	580	0.478	0.491	..
II (A)	647	0.465	0.691	32.7%
II (B)	584	0.433	0.521	16.9%
III	100	3.040	6.938	56.2%
IV	414	0.483	1.008	52.1%
V	201	0.473	0.508	7.0%
VI	198	1.318	1.873	29.6%
VII (A)	59	0.983	1.203	19.3%
VII (B)	136	0.794	0.928	14.4%
VIII (A)	50	2.800	6.720	58.3%
VIII (B)	50	1.920	3.313	42.1%
IX (A)	55	2.473	3.704	33.2%
IX (B)	61	0.705	0.897	21.4%

For each one of Greenwood and Woods' tables the estimated percentages of the variance of accident records attributable to differences in accident liability is given. As stated on a preceding page, the estimated variance of accident liability is the difference between the obtained variance of accident records

<sup>4</sup> The computations do not appear to be accurate in all cases. It is to be noted that the paper appeared in 1919 prior to Fisher's pointing out the procedure for determining degrees of freedom.

and the mean number of accidents. Dividing this difference by the variance of accident records we obtain the percentage of the variance attributable to differences in accident liability. In addition, the following data are also given: the number of cases, the mean and the variance of accident records.

The median percentage of the total variance attributable to differences in accident liability is 31.15. The percentages range from 7% to 58.3%. In nine of the twelve cases the percentage is less than 50. These figures hardly correspond to the impressions one is likely to derive from textbook accounts. The share of differences in accident liability in the variance of accident records is very variable; it exceeds 30% in only half of the cases while the rest of the variance which is more than twice as large must be attributed to unpredictable "chance" factors.

Newbold (9) collected a large number of sets of data from a number of factories. The factories were chosen on the basis of uniformity of the work performed, completeness of accident recording and opportunities for many minor accidents. The large majority of the accidents were trivial in nature, the author stating that the serious injuries were too few for correlational work. The findings differ in some respects from those of Greenwood and Woods.

A large variety of results can be found in Newbold's material. Nevertheless, in general the ratio  $\frac{m_2' - m}{m_2'} \times 100$  tends to be considerably larger than

in the data of Greenwood and Woods. It also tends to be larger than in the other studies we have examined. This difference between Newbold's data and those of the other investigators is due in part to the fact that the mean numbers of accidents per person are rather large as compared to those of most of the other distributions. The irregularly variable factors should become relatively less and less important in the long run. Still, this is not the whole explanation. The ratios computed for Newbold's material remain large even when compared to ratios from distributions with similar means. Table 6 presents these ratios as computed from the statistics given in Newbold's paper; the number of cases and mean numbers of accidents as given by Newbold and the variances (squares of Newbold's standard deviations) are also given. The figures may be compared to the corresponding ones in Table 5. The median percentages are 71.6 and 56.05 for the men and women respectively. The range is very great, the largest figure being 90% while at the other extreme there is an obtained variance which is actually slightly smaller than that of the corresponding Poisson distribution; this distribution closely approximates a simple chance distribution. These percentages do not accurately represent the share of differences in accident liability in the variance of accident records in all cases. Inspection of Newbold's curves suggests that many of the obtained accident distributions deviate significantly from composite Poisson distributions. This matter was only partially investigated. The amount of work involved in the computation of composite Poisson distribu-

TABLE 6. ANALYSIS OF NEWBOLD'S DATA

Newbold's Table No.	Number of Cases	Mean ( $m$ )	Variance ( $m_2$ )	$\frac{m_2' - m}{m_2'} \times 100$
EIII	226	.18	.59	68.0
FI	22	.27	.20	..
EIV	256	.41	.69	40.5
FII	81	.43	.45	4.2
MIV	106	.48	.59	19.1
EII	281	.51	.94	43.8
BII	299	.57	.81	29.6
I	190	.68	1.72	60.5
P	50	1.04	1.99	48.7
GI	47	1.47	3.76	60.9
GII	82	1.61	5.66	71.6
BI	148	1.81	5.11	64.6
MVI	218	1.95	7.13	72.6
MIII	181	2.50	6.60	62.1
AIII	304	2.56	10.56	75.8
EVI	93	2.66	12.53	78.8
EV	77	2.73	18.84	85.0
N	284	2.90	23.33	87.6
EI	440	3.64	13.76	73.1
AII	352	3.78	17.14	77.9
MI	301	3.94	14.90	73.3
MII	376	3.98	14.06	72.7
MV	92	4.07	18.15	78.6
EVII	57	5.60	56.25	90.0
AI	204	6.44	41.86	84.4
MI	380	.37	.53	30.6
GII	50	.52	1.04	50.0
GI	120	.63	1.64	61.5
MV	110	.65	1.46	53.5
I	161	.70	1.21	42.1
H	346	.79	1.35	41.3
MIII	142	1.06	1.77	40.1
BI	145	1.06	2.04	48.2
K	125	1.34	3.24	58.6
DII	98	1.39	3.39	58.9
BII	100	2.12	5.57	61.9
MII	161	2.30	8.58	73.2
C	58	2.43	7.88	68.7
DI	28	5.43	15.52	65.0

tions for thirty-nine sets of data would have been prohibitive, particularly because these data are given by Newbold in the form of graphs rather than tables. Many of these graphs appear to have been inaccurately drawn, inasmuch as there are discrepancies between the totals of workers and accidents as read off from the graphs and as given in Newbold's Table.

Nevertheless, it can be shown that in some of Newbold's sets of data composite Poisson distributions are appropriate and the percentage of the variance attributable to differences in accident liability is large. As an example, Table 7<sup>5</sup> presents the data from Newbold's graph AIII, together with the corresponding composite Poisson figures. The closeness of the fit is apparent. The accident liability share is 75.8%.

Some of Newbold's sets of data suggest that the distribution of accident liability was a discontinuous one; in these sets of data the great bulk of the cases fit either a simple or a composite Poisson distribution, but there are also a few deviant cases which lie outside of such distributions. Most of the obtained variance of accident records due to accident liability may be due to the presence of these deviant cases; in other words, large deviations from the average accident liability appear only in a very small minority of cases. Thus Newbold's set EIII is essentially a distribution of the simple Poisson type, plus one markedly deviant worker. Set EV may be viewed as a distribution of the composite Poisson type (excess variance = 41%) plus 9 deviant workers. Table 8 presents these data.

The differences between Newbold's finding and those of Greenwood and Woods, and of other investigators whose material is examined in this paper may possibly be attributed to the fact that her material consisted almost entirely of minor accidents. In spite of Newbold's statement, the reporting of accidents may not have been complete. It is difficult to ascertain the degree of completeness with which minor accidents were reported and there may have been individual differences in the reporting of accidents, producing the illusion of large differences in accident liability. On the other hand, constant personal characteristics may play a more direct role in the causation of minor accidents than in that of major accidents. Psychoanalysts generally believe that many accidents are unconscious self-injuries. It is possible that such unconscious self-injuries usually result in minor damage, just as in hysteria, in which minor self-injuries are common while major injuries are unusual. Minor accidents in industry may be often due to psychological mechanisms of the hysterical type.<sup>6</sup>

The distribution of the Connecticut licensed car drivers is essentially a composite Poisson distribution. A Greenwood and Yule "unequal liability" distribution fits the data rather well, except at the upper end. The results can be

<sup>5</sup> See footnote 2.

<sup>6</sup> This hypothesis was suggested to the writers by E. Emmons.

TABLE 8. COMPARISON OF TWO OF NEWBOLD'S SETS OF DATA WITH THEORETICALLY COMPUTED DISTRIBUTIONS

Accidents per Man	Set EIII *		Set EV	
	Actual	Equal Liability Distribution (omitting 1 case)	Obtained	Unequal Liability Distribution (Composite Poisson) (omitting 9 cases)
0	201	197	24	22
1	21	26	22	19
2	2	2	8	12
3	1	0	5	7
4	0	0	6	4
5	0	0	1	2
6	0	0	1	1
7	0	0	1	0
8	0	0	3	0
9	0	0	2	0
10	1	0	1	0
11	0	0	0	0
12	0	0	0	0
13	0	0	0	0
14	0	0	0	0
15	0	0	1	0
16	0	0	1	0
Total.....	226	225	76	67

\* The discrepancy between the "actual" and the "equal liability" accident totals is due to a similar discrepancy between the totals as given in a table in Newbold's paper, and as obtained from her curve.

accounted for if one assumes that the distribution of accident liability deviates slightly from a Pearson III curve. The estimated portion of the variance of accident records attributable to differences in accident liability is 21.2%. Table 9 presents these data.<sup>7</sup>

There is corroborative information from other sources, indicating that differences in accident liability often account for only a relatively small portion of the variance of accident records. The correlations between accident records in different periods of time reported by Newbold (9) and more recently by Ghiselli and Brown (5) are in most instances not high. Newbold's correlations range from -.01 to +.71, with a median of +.36. Ghiselli and

<sup>7</sup> See footnote 2.

Brown's correlations range from +.15 to +.80 with a median of +.42; we omit the intercorrelations between different kinds of accidents presented in both papers which are considerably lower. Such correlations justify inferences which are similar to those we arrived at by the use of a different method.

It should also be noted that the differences between automobile insurance rates for people with different accident records are nonexistent. This practice is in conformity with our findings. The usual textbook discussions of accident proneness would suggest very different insurance rates for different accident records.

When no composite Poisson distribution conforms to a set of accident data the suggested procedure is not applicable. The existence of factors must be assumed, which alter the shapes of the constituent Poisson curves. Changes in accident liability of people as a function of previous accidents encountered suggest a possible explanation of such results. We did not attempt to verify this possibility inasmuch as there seemed to be no way of arriving at a reasonably plausible hypothesis about the course of these changes in terms of information available at present. The only hypothesis suggested so far in the literature seems to have been the one implied in Greenwood and Yule's "Biassed distribution," and it is untenable theoretically and therefore unsuitable for research. This distribution is simply a Poisson distribution with a different first term. If there were no initial differences in accident liability, but the first accident changed the accident liability of its participants which would subsequently remain constant, the resulting distribution would not be an incomplete Poisson distribution, because the one accident class would not grow as in the "simple chance" case. An incomplete Poisson distribution could be produced only by continuing changes in accident liability with successive accidents, and it would be a strange coincidence if these changes should be so graded as to produce a tail end of a Poisson distribution which has a completely different derivation.

The distributions which deviate significantly from any composite Poisson distributions are two of Greenwood and Woods' distributions (their Table 1A and 1B), the distributions of taxicab accidents and the distribution of street car accidents. Inspection of the data indicates that the obtained distributions are more leptokurtic than Poisson distributions, and compounding several of the latter can only flatten out the resulting shape. Several of Newbold's distributions may be in the same category; they were not examined in detail for reasons stated earlier. The share of differences in accident liability in the total variance cannot be determined in such cases. The existence of other factors than differences in accident liability and unpredictable "chance" factors must be assumed.

**Discussion.** It must be remembered that not all differences in accident liability are differences in accident proneness viewed as an individual characteristic. This point is not a new one; it has been made among others by New-

bold and by Cobb. It is disregarded by investigators who combine data about street car accidents or taxi accidents from different cities. In factory work, different jobs differ in conditions of safety. In automobile or other vehicle driving, the safety conditions are not necessarily the same from route to route, in city compared with city. The amount of mileage driven, necessary driving in adverse weather, etc., must contribute more opportunities for accidents and these are not functions of accident proneness defined as an individual trait. For example, only 21.2% of the variance of the accident records of the Connecticut drivers was due to differences in constant accident rates. When one considers the hazards of driving just mentioned, it seems logical to state that there is not much room for differences in accident proneness as a psychological characteristic, insofar as these data are concerned.

We have pointed out that in many instances the portion of the variance of accident records attributable to differences in all forms of accident liability is relatively small as compared to the residual variance attributable to the operation of factors which are not predictable in terms of either the constant characteristics of people or of their previous accident records. These unpredictable or "chance" factors when operating alone give a so-called simple chance or equal liability or Poisson distribution. The expression "chance factors" should not be misunderstood. They are not necessarily unpredictable in terms of changing features of the life situation. Thus a well-known psychoanalyst spoke to one of the writers about a man he knew who had a temporary period of accident proneness as a result of marital trouble, during which time he had several near-accidents in rapid succession. "Chance" refers only to lack of predictability in terms of constant characteristics of the individual.

There are many kinds of such "chance" factors. One kind does not seem to have received enough attention in the literature. Even when a person is clearly at fault in causing an accident, the accident might not have occurred if the circumstances had been different. One of the writers was once in a car driven by a man who did badly enough to have caused a very serious accident: the driver became frightened by a wasp on his leg and stopped looking at the road; shortly afterwards the car travelled into a ditch at the bottom of an embankment to the left of the highway. There had been no cars in the other traffic lane at the moment he crossed it, the embankment was not steep and there was no accident. About half a mile further there was a steep drop into a river on the left side. The expression "luck" seems to be quite appropriate here.

As Cobb pointed out, the correlation between accident records and a perfect test of accident proneness need not be high. One cannot use any arbitrary criterion for classifying people as excessively accident-prone. For example, Poffenberger (10) states that "accident prone drivers are those who have two or three times as many accidents as the average driver . . . the term

need not be restricted to auto accidents . . . for it covers equally well accident repeaters in industry." In many distributions examined here the number of accidents per person is one-half an accident or less. According to Poffenberger then, this would mean that persons with one or more accidents are to be considered as accident prone. This is obviously unfair. It is legitimate to select for study those people who have more than the average number of accidents but they should not be automatically classified as excessively accident prone without further evidence. Actually within a simple chance distribution some people are likely to have two to three times as many accidents as the average person. One can verify this by referring to the Poisson distributions in our tables. In most published distributions only a very small minority have accident records which lie completely above the point at which the Poisson distribution gives negligible values. As one approaches this point, one finds additional cases of more than average accident proneness, but some people with only average accident proneness who have had bad luck or temporary difficulties are also included in the group of people who have had many accidents. The problem of the exact estimation of the relative number of accident-prone individuals and bad luck individuals in any particular group of accident records is complicated. One should not attempt to make rough estimates without a comparison of obtained frequencies with the corresponding Poisson frequencies.

#### SUMMARY

1. A commonly used method of comparing percentages of men and of accidents proves nothing about the existence of differences in accident proneness. Examples proving the inconclusive nature of the method are cited.
2. Comparison of obtained accident distributions with simple chance (Poisson) distributions establishes that there are differences in accident liability but does not indicate whether these differences are large or small and does not exclude the simultaneous operation of unpredictable "chance" factors.
3. Different accident records do not necessarily represent different degrees of accident liability. A method for analysis of the variances of accident records of people into two component variances is suggested, one component attributable to differences in accident liability, the other to unpredictable "chance factors." It is pointed out that the method is only applicable when the obtained distribution resembles a composite of Poisson distributions.
4. A number of published distributions of accidents are examined by the use of the above method. The variance attributable to differences in accident liability varies considerably.

In the distributions which are examined in this paper and which do not involve primarily minor accidents, the variance attributable to differences in accident liability is in most cases between twenty and forty per cent of the total variance of accident records. Although differences in accident liability should not be overlooked as a factor in the different accident records of people, the effect of this factor is rather small as compared to the residual 60 to 80

per cent attributable to unpredictable factors. It is therefore apparent that in many instances personal accident proneness, which is but one of the components of accident liability, has been an overemphasized factor.

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## Part Seven: FATIGUE AND WORKER EFFICIENCY

### 1. Boredom in Industry

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*S. Wyatt*

Reprinted from *Personnel Journal*, 1929-30, 8, 161-171, by permission of Personnel Journal, Inc. In this article the author summarizes what he has learned about one of the major problems in industrial psychology growing out of extreme specialization and subdivision of labor; namely, the problem of boredom: its incidence, extent, causes and remedies.

Boredom is frequently though by no means always experienced by individuals engaged in repetitive work. The occasional visitor to a factory is apt to think that all repetitive processes are monotonous, and tends to regard the operatives with mingled feelings of pity and admiration. A longer and more detailed examination of the conditions of work, however, begins to reveal variety in the midst of apparent uniformity, and conversation with the operatives often discloses a totally unexpected attitude towards the industrial process. As Munsterberg remarks, "The shepherd knows every sheep, though the passer-by has the impression that they all look alike," and a similar discriminative process seems to occur in connection with the operative and her work.

**Influences Producing Boredom.** Although the experience of boredom may be less intense than the outsider generally imagines, its existence in some workers is undoubtedly very marked, and the effect on productive activity quite pronounced. Most operatives engaged in repetitive work are apparently able to maintain a satisfactory rate of working during the first two hours of the spell, but then signs of restlessness and a desire for change often begin to appear. The continued performance of the task seems to become increasingly difficult, and efficiency is maintained only at the expense of increased effort. Conversely, if this increased effort is not forthcoming, efficiency suffers. Frequently, however, a compromise between these two conflicting tendencies is effected, and the rate of working is then characterised by alternating phases of effort and relaxation, resulting in a reduction in the average rate of working together with increased variability. The feeling of disagreeableness, or boredom, experienced under such conditions appears to be conditioned by the increasing difficulty of the performance, due to the inhibiting

effect of uniformly repeated movements and the increased effort involved in maintaining activity in the face of intruding inclinations.

Operatives frequently work better in the afternoon than in the morning, and their statements indicate that the lower morning output is probably due to the increased effects of boredom in that spell. When activities provide little or no interest, the prospects are depressing and discouraging, and the effect seems to bear some relation to the magnitude of the task to be accomplished. To a person who dislikes walking, the prospects of a twenty mile tramp over uninteresting country may be almost painful, and although he starts with a certain amount of forced effort and enthusiasm, this soon disappears and leaves him in a darkened mood. At this stage the magnitude of the task may seem appalling, but as the time for lunch and rest draws near interest is awakened and depression recedes. The distance still to be traversed now shrinks considerably, and bears little resemblance to the endless trail conceived a few hours before. A new swing and liveliness characterise his step as he again takes to the road, and although these may diminish after a few more miles, they reappear with increased intensity as he enters the lap which separates him from his goal.

A somewhat similar outlook confronts the repetitive worker employed on a comparatively uninteresting process. Enthusiasm and interest are usually at a minimum towards the middle of the morning spell. They are revived by the expected and actual recuperative effects of the mid-day break, and the diminishing magnitude of the task as the end of the afternoon is approached.

**Mechanism Underlying Boredom.** The increased variability in the rate of working which is frequently observed about the middle of the spell when boredom is experienced suggests that under such conditions the mechanism concerned with the initiation and control of movement becomes impaired, and while the natural tendency is for the rate of working to be reduced, spasmodic outbursts of energy sometimes bring about the attainment of unusually high speeds. The results obtained under such conditions seem, in fact, to represent the resultant of a conflict between natural desires and volitional effort; sometimes the one, sometimes the other gaining the upper hand. A continuation of this state would, of course, be very fatiguing, but the return of a more favorable attitude, induced by consciousness of the approaching end of work, reduces boredom and facilitates activity. Hence the rate of working often becomes less variable towards the end of the spell, which again is an indication of the transitory effects of boredom experienced earlier in the period of work and evidence of the absence of any appreciable degree of fatigue.

The bored individual is also inclined to over-estimate the duration of time, and this tendency seems to throw some light on the mechanism underlying boredom. A number of laboratory experiments have been conducted on the estimated duration of time-intervals, and it has been found that the results are

affected by the number and nature of the experiences they contain. Earlier experiments showed that when a subject is occupied for a short period, the duration of that period almost always appeared to be shorter than a similar interval idly spent. With a longer interval, however, the temporal illusion was said to diminish and to be reversed when the intervals extended beyond a certain point. More recent experiments<sup>1</sup> have shown that the estimation of time-intervals is determined by the amount of mental content experienced during the period and may be independent of the activity performed. Confusion has arisen because investigators have failed to distinguish between external events and subjective experiences. It is possible, for instance, for the industrial worker to be fully occupied in manipulative activity while her thoughts may be either desultory or lively. The estimated duration of time will accordingly be very different in the two cases, since it depends upon the nature of the thought process rather than on external events. Usually, of course, the content of thought is conditioned by the perception of external situations, but the former is not necessarily determined by the latter. Waiting to be treated by the dentist may seem almost interminable, but during that time the mind is usually imaginatively engaged, and filled with more than the average number of thoughts. Had the waiting patient been able to expel all thought and make his mind a blank, time would have seemed surprisingly short because of the absence of anything to mark its passage. Benussi<sup>2</sup> seems to be near the truth when he states that a time-interval appears long when the attention of the subject is drawn towards it, and short when attention is drawn away from it. Operatives sometimes give very little attention to their work and are constantly looking at the clock, with the result that time seems to pass with unusual slowness. When, on the other hand, difficult conditions absorb the attention, they are often surprised at the accelerated passage of time.

When an activity is accompanied by interest, attention is spontaneous and the conative process functions smoothly and continuously. The thought processes constitute parts of a unified whole and the individual is not consciously aware of the associated components. Time in consequence appears to pass comparatively quickly because of the uninterrupted flow of mental activity towards the desired goal.

In repetitive processes devoid of interest there seems to be an absence of any definite conation unless it is the longing for the signal which denotes the end of the industrial day. As a result the mind of the repetitive worker is often filled with a number of varied and discordant thoughts, and attention is constantly directed to the amount of time still to be worked. Time seems

<sup>1</sup> See, for instance, *The Psychology of Time*, Mary Sturt, London, 1925; and *Allgemeine Sinnesphysiologie*, V. Kries, Leipzig. 1923.

<sup>2</sup> V. Benussi, *Psychologie der Zeitauffassung*, Heidelberg, 1913, p. 456.

to be measured by the awareness or the number of thoughts passing through the mind within a given period, and as these are both numerous and disconnected, the day appears to be supercharged with ideas and its duration in consequence overestimated.

**Factors in Work Producing or Alleviating Boredom.** Although the experience of boredom appears to be largely dependent upon personal characteristics and tendencies, it is also related to the type of occupational activity. A general comparison is frequently made between the days of craft-skill and modern repetitive tendencies. Formerly the bootmaker, for instance, was responsible for the production of the complete article. Often he was acquainted with the person who bought and wore the boots, and his interest in them was revived when they were brought to be repaired. He was supposed to take pride in the product of his skill, and the completion of each article was the satisfying outcome of his constructive effort. Nowadays the employee in a boot and shoe factory is usually concerned with the repeated production of a single part, and has no personal interest in the final product or its destination.

There is little doubt that the varying nature of the work, with its appeal to the constructive instinct and resulting pleasure in achievement, associated with the days of craft skill, were much less conducive to boredom than the repetitive processes of modern industry. The latter, however, sometimes contain elements which are unfavorable to the development of boredom. Thus operations involving attention and adjustment in response to varied situations are generally less boring than those which make only intermittent and partial appeals to mental activity. In the former case the mind is actively and sometimes interestedly engaged; conative tendencies are constantly aroused in response to unexpected situations, and present obstacles to the intrusion of incompatible tendencies. In the latter the mind is frequently disturbed by elements in the industrial situation, but remains comparatively unoccupied during the intervening periods. At such times thought is free to dwell upon such distressing matters as the length of time still to be endured, and boredom is liable to supervene. Mind-wandering may, of course, provide a certain amount of relief, but the frequent interruptions make the process very discontinuous. Providing the mind can be actively engaged, whether in connection with the industrial process, or in activities entirely dissociated from the conditions of work, boredom is not likely to arise with any degree of intensity.

Another antidote to boredom is the mild excitement and interest created by attempting to keep pace with machines running at a fixed speed. Provided this tempo is suitably adapted to the natural rate of working of the operative, it frequently acts as an incentive to activity when the tendency of the operative is to relax, and the rhythmical movements promote a pleasant emotional effect.

The additional incentive and satisfaction which accompanies a piece-rate system of payment also tend to retard the onset of boredom. There is little doubt that when the rate of payment is based upon the amount produced, the operative is dimly aware that each unit of output has its equivalent in the amount received at the end of the week, and consequently the activities acquire a derived interest which is absent from a time-rate system of payment. As a result boredom tends to be more prevalent when the operatives are paid according to time worked and is diminished by the additional interest and satisfaction associated with a piece-rate system of payment. A somewhat similar view has been expressed by a German writer,<sup>3</sup> who stated that boredom is influenced by the system of wage-payment, and concluded that a time-rate was more conducive to boredom than a piece-rate.

The experience of boredom is also dependent to a certain extent upon the method by which material is supplied to the operatives. Quantities which take about an hour to complete give much more satisfaction than an endless flow along a conveyer, because of the interest and pleasure associated with consciousness of achievement. Anyone who has been confronted with the task of turning-over half-an-acre of ground will be familiar with the overwhelming nature of the outlook. If, however, he deludes himself that the area is really composed of smaller parts and sets himself to complete one of these instead of the larger whole, the disagreeable features shrink to small proportions, interest is revived, and work proceeds with a swing. A somewhat similar situation confronts the person who is condemned to memorize a long poem. Although certain psychological considerations suggest the "whole" method of learning rather than the "part," there is little doubt that the latter is more interesting than the former because of the smaller magnitude of each successive task and the satisfaction arising from each sectional achievement. In industry also, the completion of each batch of supplies, whether it be three gross of tins to be sealed, two dozen handkerchiefs to be folded, or four dozen filaments to be wound, is regarded by the operative as a self-contained task within the larger whole. Instead of developing symptoms of an inferiority complex she feels she is well "on top" of the job, experiences satisfaction as each batch is approaching completion, and is pleasantly relieved when the end is actually attained. No such variations fall to the lot of the conveyer worker, who is carried along by the never ending stream of supplies.

The length of time during which a repetitive form of activity can be endured with a certain amount of satisfaction seems to have its root in the evolutionary process. As Bücher remarks,<sup>4</sup> "children and primitive people seldom persevere with an occupation, and they tire of it more or less quickly

<sup>3</sup> H. Sachs, "Das Monotonieproblem," *Zeits. f. ang. Psychol.*, Vol. XVI, 1920, p. 71.

<sup>4</sup> Bücher, *Arbeit und Rhythmus*, Leipzig, 1896.

as it demands greater or less concentrated attention and continuous exertion. This is not because they are incapable of standing bodily fatigue, but that they are incapable of continuous mental effort which involves inhibition of other activities and consequently a special fatigue."

Although adult operatives differ from the type of individual specifically mentioned by Bücher, their desire for change in the form of activity, or for the division of work into a number of circumscribed tasks, is comparable to that of children or primitive peoples. In some operatives it is more intense than in others. Hence, whenever possible, it is advisable to break up the supply of industrial material into units which evoke a series of conative tendencies with their accompanying interest and satisfaction.

**Differences in Intelligence, Habits and Temperament.** Apart from the effect of variations in the objective conditions of work, individual differences in response to similar situations are also instrumental in determining the degree of boredom experienced. Clearly an important problem for future research is the determination of the personal characteristics which make the worker peculiarly susceptible to boredom, to be followed by the construction and application of suitable diagnostic tests for guidance purposes. The path to be pursued has been faintly indicated by some of the results obtained in a recent enquiry.

In the first place, it has been shown that workers endowed with a comparatively high degree of general intelligence tend to be bored by repetitive conditions of work, while those with a much lower order of intelligence are generally more satisfied with uniformly repeated activity. If further research corroborates this view, an important advance will have been made.

Secondly, some individuals seemed to suffer from boredom because they were unable to indulge with freedom in such remedial measures as mind-wandering or conversation, unless, at the same time, productive efficiency was appreciably impaired. Individual differences in ability to mechanize the task were appreciable, and those who are successful in this respect not only conserve energy by relegating performance to the lower levels of the nervous system, but are also in a better position to enjoy any personal or social amenities associated with the conditions of work. A man may swing his legs thousands of times in the course of a twenty mile walk, and conversation with a pleasant companion would not impair progress, but act as an antidote to boredom. If, however, he had to concentrate attention on every step, exhaustion would quickly supervene.

Thirdly, it is highly probable that the degree of boredom experienced by individuals employed on repetitive work may be conditioned by temperamental tendencies. These tendencies, which appear to be inherited, are responsible for many varied forms of behavior, and determine whether a person shall be active or reflective, excitable or phlegmatic, stable or unstable. An individual who is temperamentally lively and mercurial will probably be

unsuitable for repetitive work, while one who is patient and submissive may be better adapted to such conditions. Since temperamental tendencies are believed to be almost as deep-seated and persistent as the instincts, and to be intimately connected with occupational success,<sup>5</sup> their investigation appears to be one of the most important problems for future research.

**Suggested Remedies.** *Rest Periods.* Since the natural inclination of the bored industrial operative is to discontinue the unpleasant activity, rest would appear to be the most obvious remedy in such cases. This possibility has already received recognition in some industrial establishments, and the value of a pause as a means of alleviating the effects of boredom has also been the subject of special enquiry.<sup>6</sup> There is not the least doubt that a rest of ten minutes duration, introduced about the middle of the work-spell, tends to neutralize the unpleasant and unfavorable effects of repeated activity, and is capable of producing an increase in output varying from 2 to 10 per cent.

Equally efficacious in this respect is a change in the form of activity. Just as the apparently fatigued muscle may be induced to resume activity by changing the weight it lifts, so the impaired activity of the repetitive worker may be improved by changing the conditions of work.

In many industrial processes the workers have to return finished work and procure supplies and, providing the excursions involved in this procedure occur at suitable times, they are very effective in supplying the necessary change in position and activity. Even more beneficial are the situations which provide a complete change in the form of activity about half-way through the spell of work. The results of numerous investigations have shown that a change of occupation every two hours or so throughout the day reduces boredom and has a beneficial effect on output. There are many industrial processes in which this procedure is possible, and the question has been fully discussed elsewhere.

*Short Pauses for Conversation.* In addition to these remedial measures, the results of the present enquiry show that workers often unwittingly resort to various devices for the purposes of neutralising the effects of boredom. Of these, perhaps the most noticeable is conversation with other operatives. This procedure is a natural and effective antidote to boredom, since it diverts attention from the unpleasant aspects of work and provides an interesting outlet for the expression of personal desires and inclinations. Talking is particularly prominent where the workers form a compact social group, and although it impairs the rate of working whenever attention is necessary to efficient performance, it is probable that output would be still further reduced if talking were prohibited and boredom in consequence allowed to reign.

<sup>5</sup> See, for instance, "Temperament and Social Status," by F. C. Bartlett, *Journal of the National Inst. of Industrial Psychology*, Vol. 3, No. 8, p. 401.

<sup>6</sup> Reports Nos. 25 and 32 of the Industrial Fatigue Research Board.

supreme. In this connection it is interesting to speculate upon the possible effect of introducing a few short rests within the spell of work during which the workers could let off conversational "steam." By this means conversational tendencies might possibly coalesce, and talking to the accompaniment of work thereby reduced to a minimum. Since talking requires an audience, it follows that the isolated worker will usually be unable to indulge in conversation and consequently will be denied its ameliorating effects. As a result, one would expect to find boredom more pronounced in the case of isolated workers, and statements made by the operatives support this view.

*Conditioning Day-dreams and Reveries.* Another prominent tendency of repetitive workers is their indulgence in reveries or mind-wandering whenever opportunity permits. Day-dreaming appears to compensate for the deficiencies of life in general and industrial conditions in particular. The worker who is able to day-dream becomes oblivious to unpleasant realities and remains comparatively undisturbed by the unsatisfying features of repetitive work. She is able to exist happily in a world of her own creation, unless, of course, depressing moods determine the content of thought. Situations of the latter type, although probably in a minority, do occasionally exist, and are sometimes conditioned by grievances arising from the conditions of work. The grievance may initially be of minor significance, but uncontrolled rumination is often favorable to its growth, with the result that it eventually finds expression in serious industrial unrest. The creation of a healthy industrial atmosphere is particularly important in this respect. It not only prevents the development of undesirable thoughts, but often sterilizes them at their source.

The extent to which thought can be detached from work will depend upon the nature of the task and the characteristics of the individual. Obviously the more repetitive and uniform the process, the more automatically will it tend to be performed. When activities become habitual, the mind is free to pursue its own inclinations and the conditions are conducive to mind-wandering or phantasy formations. Simple and uniformly repeated operations are, however, by no means the only processes which may be performed with a minimum of attention. Driving a car in city traffic or even the performance of a Beethoven Sonata may, under certain advanced conditions of achievement, become almost habitual, and thought is left free to dwell on other things. Obviously a simple repetitive process will be more easily automatized than a more complex operation, consequently many industrial conditions appear to be particularly favorable to mind-wandering.

As a general rule, boredom seems to be experienced when the attention of the operative is not entirely required by the industrial task, and yet at the same time she is unable to detach her thoughts from the industrial situation. In this respect individuals differ considerably, for while some gifted persons are able to perform two or three operations simultaneously, others are dis-

turbed whenever their thoughts are diverted to subjects having no connection with the work in hand. In short, the more the mind is occupied, whether it be in the process of production or in the more detached operation of mind-wandering, the less likely is boredom to be experienced.

It is generally believed that mind-wandering or day-dreaming is particularly prevalent in the introvert type of person, while the extrovert seldom or never falls into such a state. Further investigation may show that the experience of boredom may be rare in the introvert because of his tendency to seek refuge in day-dreams, while the extrovert, full of activity and interest in external situations, may find repetitive conditions unsatisfying and tedious.

Since, therefore, day-dreaming may be a pleasant means of escape from the monotonous conditions of work, and in many cases satisfies personal cravings, it cannot be wholly condemned, but must be accepted as a frequent and possibly beneficial derivative of repetitive work.

At the same time, it must be remembered psycho-analytic enquiries have shown that reveries, like dreams, may contain unpleasant memories of past emotional experiences. Grievances, anxieties, worries, and fears are notoriously persistent, and emerge into consciousness whenever the "censorship" is relaxed. Recurrent experiences of this type uncritically received sometimes assume grossly exaggerated proportions, and become the dominant determinant of behavior. The individual fails to distinguish between imagined and real situations, and in extreme cases the imagined plan may be carried into execution. There is, as yet, no evidence that the day-dreams of industrial operatives lead to such abnormal states.

*Making the Work Interesting.* All the remedial measures such as rest-pauses and changes in activity, together with alleviating tendencies like talking and mind-wandering, would be practically unnecessary as a means of combating boredom if work were interesting. Interest is the greatest enemy to boredom, and although repetitive work can never possess the inherent interest of skilled craftsmanship, much might be done to improve industrial conditions in this respect.

In the first place, although the task may appear to be the monotonous repetition of simple movements, boredom need not be unduly pronounced if the operator feels that the work is worth while. Knowledge frequently creates and extends interest, and instruction regarding the preparation, production, distribution, and use of industrial commodities would create new and varied points of contact between the operator and her work. Thought would be promoted along wholesome lines and much of the stagnancy of "unfilled time" thereby removed.

*Improving the Industrial Atmosphere.* Since boredom is conditioned not only by the type of industrial process, but also by the entire industrial atmosphere, it is important that the latter should be beyond reproach. In regiments, universities, schools, and similar institutions, traditions and

standards of achievement are set up and feelings of pride engendered among the various members. A definite attitude of mind or sentiment is created in connection with the institution, which makes individual members very consciously aware of their position in relation to the organization. The behavior of the individual is largely determined by the nature of the prevailing sentiment or group consciousness; and habits of action and thought are inculcated which conform to the traditions of the institution and meet with the approval of the community.

In certain factories and workshops a similar group consciousness exists which is capable of further development. In a particular mill in the cotton industry, for instance, the operatives are proud of the reputation enjoyed by the firm, and endeavor to preserve it by turning out work of exceptional quality. To work for this firm has become the desire of all the operatives in its locality, with the result that the firm is staffed with contented and enthusiastic workers.

This desirable sentiment can be fostered and developed by promoting and extending the social life of the operatives. Games are particularly useful in this connection, and the formation of football or hockey teams which take part in inter-works competitions develops the consciousness of belonging to a particular firm. Thus Smith's operatives become more distinctly Smith's when opposed to the workers of another firm, and to play and work for Smith's becomes an integral part of their conscious life. A thoughtful and humane employer can be most instrumental in promoting this sentiment, for the interest he takes in the work, play, and general welfare of his operatives will be reciprocated, and a harmonious and well-knit community will be the result. There is no reason why the attitude of operatives towards a firm should be very different from that of the members of public schools, universities, and regiments toward their respective institutions. Loyal and enthusiastic operatives, surrounded by a sympathetic and friendly atmosphere, will experience a satisfaction which reduces boredom to comparative insignificance.

*Society's Responsibilities to the Repetitive Worker.* Unless operatives are able to find facilities for development outside the factory, it seems probable that long and repeated exposure to monotonous conditions of work will have a dulling effect on mentality, and lead to the formation of habits which may impair their value as members of the community. It is undoubtedly largely true that workers who for years have been employed on simple repetitive operations, have no desire to change, and dislike being transferred to any process requiring judgment and thought. How far this attitude is the result of long exposure to monotonous conditions it is difficult to say, but it is probable that in the early stages of their industrial life they were eager to progress, but the absence of stimulation in the industrial environment has left them increasingly inert, and content to exist in the narrow groove of daily

routine. Although in many individuals the natural tendency is to behave in accordance with the lines of least resistance, repetitive work seems to accentuate this tendency, instead of stimulating thought and action along original paths. It is probable, therefore, that the unfavorable effects of repetitive work are not confined to the industrial environment, but extend to activities outside the factory and have a detrimental influence on thought and behavior in general. The provision of attractive educational and cultural facilities is accordingly of the utmost importance, if the repetitive worker is to take her place as a harmoniously developed and worthy citizen.

## 2. A Study of Fatigue

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*C. S. Meyers*

Reprinted from the *Journal of Personnel Research*, 1924-25, 3, 321-334, by permission of Personnel Journal, Inc. Although published 27 years ago very little of the basic material in this paper is "dated" by subsequent research. Investigations in Great Britain conducted by the Industrial Fatigue Research Board and the National Institute of Industrial Psychology are summarized and weighed by the author, who has a medical background as well as extensive research experience in the laboratory and shop.

In approaching the subject of industrial fatigue, it will be well first to summarize our knowledge of fatigue as derived from laboratory experiments.

**The Nature of Fatigue.** The muscle-nerve preparation served as the first instrument for inquiry into muscular fatigue. It has provided us with data which strongly suggest that each striated muscle fibre when stimulated responds by an all-or-none contraction; that is to say, if the stimulus is but sufficiently strong to produce a contraction, the muscle fibre contracts to the same extent, however strong be the stimulus. We have reason to believe that the muscle fibres while at rest secrete within them a store of material, in the form of glycogen, ready to break down, on or after the application of a suitable stimulus, into lactic acid, carbon dioxide, etc., a decomposition which is associated with contraction, the generation of heat and the production of electrical changes. It is conjectured that different muscle fibres within any one muscle show different degrees of irritability, so that while a weak stimulus is only able to affect a few muscle fibres, a strong stimulus will involve a larger number of fibres, the degree of contraction of the whole muscle thus being determined by the number of muscle-fibres which are at that moment in a state of contraction.

Study of the muscle-nerve preparation has further taught us that the response of the muscle-fibre is not only determined by the amount of stored material available but also by the rate of removal of the products of decomposition of that material. To these two factors—loss of explosive material and accumulation of its katabolic products—have been generally attributed the phenomena of muscular fatigue, *i.e.*, the loss of response to stimulation consequent on repeated muscular exercise.

The muscle-nerve preparation also indicated that the end plate—the structure in which the nerve-fibre terminates at the muscle-fibre—is more readily fatigued than the muscle-fibre itself, blocking the transmission of the impulse from nerve to muscle at a time when the muscle-fibre is still responsive to a stimulus applied to it directly.

*The Importance of Inhibition.* Then came experiments on the intact organism by means of the ergograph, an instrument ideally recording the voluntary contractions of a single muscle—a series of flexor movements at a single knuckle joint, involving the lift of usually a relatively heavy weight. In these conditions fatigue appeared to be largely due to inhibitory nervous impulses ascending from the muscle to the central nervous system, and making it more and more difficult for impulses to descend to that muscle which would otherwise throw it into contraction. Some of these ascending impulses from the exercised muscle affect consciousness in the form of discomfort, pain or cramp, but others act purely reflexly, blocking the path of outgoing impulses, thus inhibiting voluntary movement. Hence when volition is powerless to evoke further ergographic records, they may still be obtained by stimuli applied on the skin surface to the motor nerve running within the limb to supply the muscle whose contraction is being studied.

The importance of nervous inhibition in safeguarding our striated muscular system from exhaustion is also seen in certain conditions of general fatigue or in certain stages of the influence of alcohol. The higher nervous levels appear normally to exercise an inhibitory influence over the lower, which may disappear in fatigue and under the influence of alcohol. Such loss of higher control may manifest itself temporarily in an increase in the amount of muscular work performed. Hence higher fatigue does not necessarily imply immediate reduction of muscular work, although it involves all the consequences of lessened control—first, loss of that delicate coordination of movement associated with the higher nervous levels, and second, extravagant expenditure of muscular energy.

Ergographic and muscle-nerve experiments also indicated the importance of rest pauses in relation to recovery from the effects of muscular exercise, a far greater total amount of work being elicitable when more frequent rests were introduced.

*The Work Curve.* Next came laboratory experiments into mental fatigue, which consisted essentially in the study of curves of output recorded minute

by minute, or five minutes by five minutes, during an hour or more's mental work. This work was of a simple uniform character e.g. adding pairs of figures, or erasing a prescribed letter throughout a printed text. Here, again, the value of rest pauses on subsequent output was demonstrated, and attempts were made to determine the most favorable length of rest pause for a given period of mental work. But the chief value of such experiments lay in the analysis of the work curve, which brought to light the play not only of practice and fatigue, not only, that is to say, of the acquisition of skill and of the loss of efficiency produced by exercise, but of (a) incitement, the warming up of the subject to his work after he had been withdrawn from it, (b) settlement, the neglect of distracting conditions—and (c) spurts, of which the most striking are the initial spurt when the subject starts fresh to his work, and the end spurt when he realizes that the end of his work is approaching.

**Factory Fatigue.** Valuable as have been the results of these laboratory experiments, they have proved far from adequate in their practical application. The conditions of laboratory experimentation are widely removed from those of work-a-day life. Muscular fatigue cannot be isolated in the factory, as in the laboratory, from such influences as skill and intelligence which depend on the proper functioning of the highest levels of the central nervous system. The most unskilled labour is really skilled, in the sense that there are good and bad methods of carrying it out. Further, a worker's movements cannot be compared with the movements of the subject of an ergographic experiment who lifts his finger repeatedly and rhythmically with the utmost force and to its utmost extent until he can move it no longer. The worker knows better than to exhaust himself in a relatively brief period by employing his utmost energy; he regulates his output according to his feelings of fatigue and according to the length of the period over which he has to work.

**Variations of Output.** Thus it comes about that, whereas in laboratory research feelings of fatigue are not incompatible with a temporarily increased output of work, owing to the removal of normal inhibitory influence in everyday life, as Muscio's experiments<sup>2</sup> have indicated, such feelings are more closely related to the varying output throughout the day. Moreover, as he has also shown,<sup>3</sup> even when no work has been done, a worker's efficiency, as demonstrated by interpolated tests, varies at different hours, the efficiency curve in a resting worker being similar in form to that revealed by actual work throughout the day but at a higher level.

**Adaptations to Length of Day.** The adaptation of the worker to the length of the working day has been well demonstrated by Vernon<sup>4</sup> in his observa-

<sup>2</sup> *Brit. Jour. Psychol.*, 1921, vol. xii, pt. 2, pp. 150-162.

<sup>3</sup> *Ibid.*, 1920, vol. x, pt. 4, pp. 327-344.

<sup>4</sup> *Indust. Fatigue Res. Board, Report No. 6.*

Study of the muscle-nerve preparation has further taught us that the response of the muscle-fibre is not only determined by the amount of stored material available but also by the rate of removal of the products of decomposition of that material. To these two factors—loss of explosive material and accumulation of its katabolic products—have been generally attributed the phenomena of muscular fatigue, *i.e.*, the loss of response to stimulation consequent on repeated muscular exercise.

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tions on the effects of changes in the length of the working hours. An improvement in rate of output almost invariably results from shortening the working day; but generally it does not occur immediately, or at all events it does not attain its maximal effect immediately. Weeks or even months may elapse before the full beneficial effect of the reduction of hours on rate of output is reached. The output continues slowly to rise for a period varying, apparently, with the kind of work involved, and varying no doubt with the worker, until uniformity is again established. This can hardly bear any other interpretation than that the worker consciously or unconsciously adapts himself to the length of his day's work or of his work spell or shift. Hence, when that length is suddenly shortened, some considerable time is needed, during which he can adapt himself completely to the new conditions of work.

There is no doubt a complexity of other factors determining this change in rate of output. Thus, the worker's output is consciously or unconsciously influenced by that of his fellows and by the tradition of the factory. For this reason, the speed and extent of improvement in rate of output in a shop must depend on those who initiate it. By force of suggestion if they are workers who have prestige among their fellows their action will be more or less unconsciously imitated, whereas workers of inferior standing will arouse resistance rather than co-operation. But, apart from such complicating factors, the broad conclusion we are justified in reaching is that more or less unconsciously the industrial worker regulates his rate of output, according to the length of his working spell or day.

In this connection, it is interesting to observe that whereas adaptation to shortened periods of work is slow, adaptation to lengthened periods is quick. Thus, in the case of mill men engaged in the tinplate industry, while it took eight to ten weeks to reach the maximum of output after a change from an eight-hour to a six-hour shift, on reversion to the eight-hour shift the output fell at once approximately to its previous level without any appreciable period of adaptation.

But apart from the fact that the worker does not, like the ergographic experimenter, continually put forth his utmost power, he differs further in the fact that he is not always using the same joint or the same muscle. He varies his posture as he begins to feel discomfort, now using another, for the same work, so that the previously used set may regain their freshness. Moreover, he is not contracting his muscles against so heavy a weight that in a relatively small number of lifts it is likely to produce complete impotence to execute further contractions.

*Monotonous Work.* Similar objections hold in the case of laboratory experiments in mental work, where, again, the subject is working his very hardest for a relatively short period of time, and the work performed is of the most uniform monotonous character, so uniform, indeed, that after a little practice, it is at times carried on quite unconsciously. If monotonous work in

industry can be called—as I think it should be called—mental work, then the laboratory experiments are to that extent comparable with the monotonous conditions of industrial life. But they are clearly incapable of throwing much light on fatigue in work which demands the continual conscious exercise of intelligence.

**Adaptation.** This brings me to a further difficulty, depending not on the inapplicability of laboratory experiments to industrial conditions, but on the incompleteness of our knowledge of fatigue derived from experiment itself. It is impossible to believe that in such experiments as I have described we have the whole story of fatigue.

No doubt, in ergographic and in heavy muscular industrial work, pain or discomfort are largely instrumental in inhibiting further activity. But these are protective only. If they be disregarded, or if such feelings become blunted, further activity is possible. Moreover, increased interest, excitement, the influence of emotion or suggestion, may, as is well known, either prevent fatigue from manifesting itself or lead to a revival of muscular or mental activity. Let us endeavor to form some idea of how this occurs.

Muscular contractions, and acts of apprehension, decision and the like are one thing. They may perhaps be regarded as explosive acts fired off much as a heat spot fires off, so to speak, its sensation, and then requires rest for recovery. But these contractions and acts occur in a setting of tone, posture, and attitude, perhaps much as the heat and cold sensations appear to occur in a setting of sensibility to warmth and coolness. The muscular contractions and mental acts are of an intenser, more momentary character, readily susceptible of fatigue, whereas muscular tone and posture, and mental attitudes are of a milder, more prolonged character, far more resistant to fatigue.

*Sources of Fatigue in Mental Work.* We can endure the light of a northern summer for hours without fatigue: adaptation appears to enter in its stead. We can maintain a given posture likewise for a prolonged period: adaptation appears to step in, coordinating activity within pairs of antagonistic muscles, and perhaps setting up some "give and take" between them. It is this process of adaptation which finally tires. In mental work it is the ability to preserve the right attitude that finally tires, then making further mental work disorderly and useless. Of this kind of fatigue we know practically nothing. When we are engaged on a given piece of mental work—let us include even the repeated addition of pairs of figures and muscular work, for even this, I would insist, involves mental work—all conflicting nervous impulses must be inhibited, other distracting ideas and other muscular movements must be suppressed in so far as they are incompatible with the work at hand. Such inhibition in itself involves work. I know of no physiological evidence to support McDougall's view that inhibition is merely the result of the drainage of energy into other channels which are simultaneously active. The suppression of conflicting emotional states in psycho-neurotic conditions affords an

adequate example of how active a process inhibition is. But this inhibition of incompatible attitudes though it may last a long time, cannot continue for ever. It becomes more difficult, partly perhaps through nervous blocking, partly because the inhibited or repressed attitudes and acts gain in strength and finally insist on manifesting themselves by bursting through the restraint imposed upon them.

*Boredom and Fatigue.* We thus gain some idea of the place of boredom in our conception of fatigue. An attitude may be maintained, at first, by interest, the work being intrinsically and spontaneously attractive. Later, volitional acts have to be employed to maintain this attitude, and as these become more difficult and more ineffective, the feeling of interest gives place to one of increasing boredom.

It is naturally the most delicate and latest acquired functions that suffer most in mental fatigue. In the work of adding pairs of figures, it is not so much the speed or accuracy of the reaction to  $2 + 1$  that becomes impaired as the ability to attend to and to apprehend the meaning of this presentation. Reaction times are in themselves poor indices of fatigue. What suffers is the inability to preserve the proper attitude.

The more intelligent the worker the more irksome becomes monotonous work, the more difficult becomes the maintenance of the required attitude, because of the demands of his intellectual processes. An interesting illustration of this is afforded by a recent investigation by Miss I. Burnett<sup>5</sup> who in a laboratory experiment engaged four unemployed work girls in the daily repetitive work of cross-stitching throughout two months. Of these four girls, two had been rated by an intelligence test as highly intelligent, the third showed average intelligence and the fourth was distinctly below average in intelligence. Each of the first two girls showed distinct signs of boredom in the work; the one was restless and yawned, seizing every opportunity for change of posture and engaging far more often than the others in conversation, while the other confessed that she found the work "very tedious and would not like to do it regularly." These two most intelligent girls "were capable of reaching a high output from time to time but were unable to maintain it." The worker who was rated third in intelligence did by far the best work, 12 and 16 per cent respectively more than the two girls who were rated highest in intelligence. She declared at the end of the experiment that "so far from experiencing any strain of monotony as a result of the repetitive work, she had rather liked it." Her regularity of output, too, was far greater than that of any of the other girls, 14 and 25 per cent greater than the two most intelligent, and 22 per cent greater than the least intelligent. The latter showed very considerable improvement with practice but made a very bad start and appeared hampered by clumsiness, holding the needle with difficulty,

<sup>5</sup> *Jour. Nat. Inst. Indust. Psychol.*, 1924, vol. ii, no. 1, pp. 18-23.

and picking it up with difficulty from the floor on to which she frequently dropped it. She offered no objection to the repetitive work, but complained of the occasional conversation of the other girls.

The practical outcome of these experiments is that monotonous work requires a certain degree of intelligence, but that it suffers appreciably if too great intelligence be brought to bear on it. Such ill effects may be safeguarded, as we shall see, by rest pauses and by changes of work. They may also be prevented by recourse to day-dreaming and in certain circumstances, especially when the work is rhythmical, by refuge in song.

*Effects of Varying Work.* In some laboratory experiments on the effects of varying work, carried out by Wyatt<sup>6</sup> on three young adults during two daily spells of 2½ hours each, lasting over six weeks, the output increased by amounts varying from 2.4 to 24.2 per cent. The errors decreased by amounts varying from 9.2 to 55.1 per cent (according to the subject and the work), when the nature of the work was changed at about fifty-minute intervals. The work was of three kinds—adding in the head sets of 5 digits, adding, by mean of a comptometer, columns of 10 digits, and pulling every half-minute against a powerful spring balance with the right and left hands alternately. During three of every four days one or other of the three tests was worked continuously. On the fourth day each spell was divided into three periods of fifty minutes, and the three tests were consecutively given during the three periods. The results, as I have said, varied according to the worker and his liking for the work performed.

On the other hand, too many changes of work must obviously have a deleterious effect on output. In a manufacturing chemist's work, an increase of from 17 to 20 per cent in wages earned was found by Wyatt<sup>7</sup> to occur when the operative changed approximately every half-hour from one process to another instead of, as before, carrying out from 100 to 250 different changes of process in the course of the day, giving an average duration of from two to five minutes for each process.

*Rhythm.* Closely allied to preservation of the right attitude and posture is preservation of the proper rhythm and of due coordination of the various movements that make up an operation. Just as the members of a boating eight become "ragged" in fatigue, using useless energy with relatively useless results, so the tired worker "falls to pieces"; his rhythm and skill suffer.

In the operation of roughing, *i.e.*, removing scratches and imperfections from spoons and forks, which are pressed for the purpose against a rotating wooden leather-covered wheel, oily sand being allowed to fall between the wheel and the article that is being roughed, Farmer and Brooke<sup>8</sup> estimated

<sup>6</sup> *Indust. Fatigue Res. Board, Report No. 26.*

<sup>7</sup> *Ibid.*

<sup>8</sup> *Ibid., Report No. 15.*

by means of a recording watt meter, the number and duration of strokes, the pauses between the strokes and the pressure of the strokes against the wheel, as the output fell off from fatigue. They found that the number of strokes per spoon, the duration of those strokes, and the pressure with which the strokes are applied increased towards the end of the spell in spite of the fact that, at this time, when output is actually diminishing, fatigue may be supposed to be present. As they express it, the tired worker is "not only working slower than when she is fresh but is expending her energy extravagantly."

The number of strokes per spoon remains nearly constant during the morning; which is a fair indication of the maintenance of a steady rhythm. It is during the afternoon, especially towards the end, that the greatest variations occur. Just as when interest fails, constant volitional efforts have to be employed to maintain the requisite mental attitude, so when the natural rhythm fails through fatigue, conscious efforts have to be invoked to carry on the work.

It is in this sense that I ally rhythm with muscular posture and mental attitude. All three can be prolonged for some considerable time before fatigue sets in. All three may be regarded as a kind of matrix in which mental and muscular acts are set. All three require for their maintenance a directive activity which ultimately tires—an activity of the nature of which we know no more than we do of that directive activity of which it is an expression—that activity which par excellence distinguishes animate from inanimate nature.

*Abnormal Fatigue.* Fatigue, in the sense of a diminution of efficiency owing to prolonged exercise, is of course a normal and healthy result of all work; it can only be considered serious and abnormal when after the rest which follows any given spell of work, it is not almost wholly dissipated. For then, spell by spell, day by day, the fatigue effects accumulate and the time must sooner or later arrive when healthy fatigue is replaced by pathological exhaustion.

Taking the daily industrial work curve and comparing it throughout the week, we actually find evidence sometimes of such accumulation of fatigue, but in general, it is practically dissipated by the week-end rest.

The amount of fatigue during the week varies with the skill of the worker. In the boot and shoe industry, for example, the most expert operative's record was found to rise throughout the week, whereas in some instances the poorer worker's began to fall from Wednesday or even earlier onwards.<sup>9</sup>

The influence of fatigue may be masked by spurts. Thus in silk weaving the best output occurs between Thursday morning and Friday noon, which is the "making-up time" for calculating the wages to be paid on the week's work.

<sup>9</sup> *Ibid.*, Report No. 10.

The approach of an annual holiday when the maximal piece-rate earnings are coveted, may lead to a similar spurt.

**Length and Distribution of Periods of Work and Rest.** The earliest attempts in Great Britain to deal systematically with the problems of industrial psychology which arose during the recent war were made by the Health of Munition Workers Committee. They concerned the proper length and distribution of periods of work and rest. There were times during the war when in Great Britain munition workers worked nominally for  $74\frac{1}{2}$ , actually for about 66 hours a week. In one case, for example,  $63\frac{1}{2}$  hours were actually worked by women engaged in the moderately heavy work of turning fuse bodies. When their weekly hours of actual work were reduced from  $63\frac{1}{2}$  to  $47\frac{1}{2}$ , their total weekly output rose by 13 per cent. An even greater increase in weekly output, an increase of 19 per cent followed the reduction of hours actually worked from 58.2 to 50.4 per week in the case of men engaged in the heavier work of sizing fuse bodies. Not only was the output thus increased, but a reduction in the amount of lost time through sickness, slackness, etc., also resulted. Thus in a shell factory the time lost fell from 11.8 to 6 per cent after the hours of work had been reduced from  $63\frac{1}{4}$  to 54 per week; while later in the iron and steel industry a reduction of the hours of work from 53 to 48 per week was followed by a reduction in lost time from 2.46 to 0.46 per cent of the working hours.

*Working Hours in Munitions and Glass Works.* But although the total weekly hours now worked in Great Britain do not generally endanger serious fatigue, we are nevertheless confronted with the important problem of the best distribution of those hours so as to secure the maximal efficiency (which includes the maximal health and contentment) of the worker. During the war a comparison was made by the Industrial Fatigue Research Board<sup>10</sup> between the output during twelve-hour and eight-hour shifts among women workers who were engaged in cutting off the ends of the roughly forged shells. It was found that that part of the work which was dependent on the worker and independent of machinery, and which was performed in 100 minutes of the long-shift system was accomplished in  $80\frac{1}{2}$  minutes when the short-shift system was adopted. That means a 19.5 per cent improvement. Vernon<sup>11</sup> has since studied the output records of four British factories in the tinplate industry. The hourly output during four-hour shifts was found to be 11.5 per cent greater than when eight-hour shifts were worked. Moreover, under this shorter-shift system the output no longer showed the serious fall at the end of each day, which occurred in the longer-shift system. Finally the amount of lost time was less.

In certain glass works in Great Britain Farmer<sup>12</sup> recently found that

<sup>10</sup> *Ibid.*, Report No. 2.

<sup>12</sup> *Ibid.*, Report No. 24.

<sup>11</sup> *Ibid.*, Report No. 1.

the hourly output increased by about 10 per cent when eight-hour shifts were substituted for ten-hour shifts. There was also an appreciable reduction in spoilt work and decrease in lost time when the shorter shifts were introduced. The increase in rate of output in the eight-hour shift was not in itself large enough to make the output equal to that in the ten-hour shift, but as the eight-hour shifts allowed of a twenty-four-hour use of the plant, the total daily output was higher than when the ten-hour shifts were employed, which involved only a twenty-hour use of the plant daily.

*Length of Rest Pause.* The most favorable length of the rest pause, and the most favorable point of its introduction can only be determined by careful expert analysis of the work curve. As the laboratory work of the Krapelin school has shown, they vary with the worker, with the nature of his work and with the duration of its spell. In a boot and shoe factory <sup>13</sup> it was desired to increase the output without adding new machinery. This was effected by allotting to each double press three, instead of the usual two, girls; each of the three working for forty minutes in each hour, and resting the remaining twenty minutes. An increase of output was obtained in the six presses worked, amounting to 45, 43, 57, 39, 43 and 75 per cent respectively, the average increase of output for the six presses being over 44 per cent. The presses showing the highest increase were those worked by the least skilled operatives, in whom fatigue was doubtless most prevalent. Lost time and sickness were diminished, and a spare girl was always at hand in emergency to take the place of an absent member of the team.

*Time Required for Improvement of Output.* Save in exceptional circumstances, however, the introduction of such lengthy periods of rest must prove impossible. On the other hand, the value of shorter rest pauses has been repeatedly demonstrated.

Vernon <sup>14</sup> has brought forward evidence to show that several months may be needed before the full effect of rest pauses may be reached. Thus in an experiment on girls making bicycle chains, it took six months. In one on labelling, it took ten weeks. Vernon has here again shown that rest pauses produce their maximal effect on the slowest workers. Thus when girls engaged on labelling were divided into three groups according to their speed of work, a ten minutes' rest effected an improvement of 8 per cent in the quickest third, one of 17 per cent in the slowest third, and one of 13 per cent in the middle third.

*Breaking Long Work Periods.* There can be no doubt that in by far the majority of operations, the efficiency of a spell of work exceeding four hours can be improved if divided into two halves separated by a few minutes' pause. Again and again, workers have testified to their appreciation of such a rest

<sup>13</sup> *Ibid.*, Report No. 10.

<sup>14</sup> *Ibid.*, Report No. 25.

interval. The work curve is thereby not only raised in height but is also improved in form. We shall presently have occasion to examine the various forms of work curve. At the moment I wish to indicate by actual example, from an investigation at the National Institute of Industrial Psychology,<sup>15</sup> how a daily work curve may be improved in form. In the following instance, before the rest pause was introduced, the work curve, averaged from a number of workers, showing the output for each half-hour throughout the day, rose until 9:30 a.m., remaining at the same level until 11:00 a.m., then declining, next rising from 12:00 to 12:30 probably through the influence of end-spurt, and finally falling slightly until 1:00 p.m. when there was an hour's break for dinner. After a rest pause of seven minutes had been introduced at 11:00 a.m., not only was the curve throughout at a higher level, but the level was much more uniform than in the previous curve, indicating perhaps a lessened call on excessive voluntary effort, and more orderly, rhythmical method of work. In the afternoon work curve, under both conditions a spurt occurs at 4:30; but where the rest pause was introduced (at 4:00 p.m.) the improvement was maintained and the curve continued to rise right up to 6:00 p.m., the end of the day's work, whereas, before the introduction of the rest pause it fell during the last half-hour. When no rest pause was interpolated at 4:00 p.m., the work curve fell sharply from 4:00 to 4:30; but after the seven minutes' rest had been introduced at 4:00 p.m., the work done during the remaining twenty-three minutes of the half-hour actually exceeded that done in the same half-hour when no rest pause was interpolated. Despite a 3 per cent reduction in total working hours due to the pause, a more than 5 per cent increase in output, with less fatigue to the worker, resulted. The workers greatly appreciated the pause.

In another experiment<sup>16</sup> an increase of over 14 per cent in output was obtained by the introduction of a fifteen minutes' interval in the morning and the afternoon, which the workers, engaged in another factory on the same work as that referred to, spent mainly in a change of work, not merely in rest. They spent the pause in collecting materials, a task which had been previously carried out partly during the first few minutes of each morning's work, partly distributed irregularly throughout the remainder of the day. The output curve showed an enormous improvement in form as well as in height. The workers were unanimous in their approval of the change.

*Improvement before Rest Pause.* That a rest pause may also show an improvement of output not only after but also before the pause is indicated by the following data obtained by Wyatt and Ogden<sup>17</sup> in a laboratory experiment consisting of adding series of 5 digits during morning and after-

<sup>15</sup> *Jour. Nat. Inst. Indust. Psychol.*, 1922, vol. i, no. 3, pp. 89-92.

<sup>16</sup> *Ibid.*, 1923, vol. i, pt. 6, pp. 236-239.

<sup>17</sup> *Indust. Fatigue Res. Board, Report No. 25.*

noon spells of work. The percentage increases of output owing to the rest pause were

	Morning	Afternoon
Before the pause.....	12.1	19.8
After the pause.....	20.5	24.1

**Interpretation of Work Curves.** A well-shaped curve should not show too many irregularities, for these indicate the excessive play of voluntary effort and inadequate help from habit and rhythm. It should not decline too greatly towards the end of the spell or work, for this indicates excessive fatigue. Irregularities, initial rises and final falls there must always be; an absolutely flat curve is unobtainable. Endspurts may or may not be present, but they are so variable in occurrence that they cannot in general be considered as diagnostic of a good or bad form of work curve.

Farmer<sup>18</sup> has recently attempted to indicate the conclusions which may be drawn from changes in the shape and level of the work curve due to a change of conditions. First, the curve may remain the same in shape but be on a higher level. This he regards as signifying that a greater output has been obtained under the new conditions with the same amount of effort, and with the same fatigue effect of the day's work. Second, the curve may keep practically on the same level but now be of a far better shape. We may then infer that the operation has been facilitated by the changed conditions in the sense not that it can be performed with greater speed, but that the cumulative effects of its repetition are less fatiguing than in the original method. Third, the curve may be on a higher level but of a worse shape. Here we may assume that the increased output has resulted from a quicker and more fatiguing method of working, such as may be expected when methods of speeding up are introduced with little regard to the health of the worker. Lastly, the curve may be on a higher level and also of a better shape. When this occurs, we are no doubt justified in considering that it indicates an easier, speedier and less fatiguing method of working, yielding a higher output with less fatigue to the worker, despite the fact that he is repeating the operation a larger number of times during the day.

*Variations Due to Individual Reaction and Type of Work.* But it must be remembered that, under otherwise similar conditions, the ideal work curve cannot be realized for every worker and for every type of work. Some individuals work better in short stages and more uniformly. The rest pauses which increase the output of some workers will, as has been shown by re-

<sup>18</sup> *Brit. Jour. Psychol.*, 1923, vol. xiii, pt. 3, pp. 308-314.

search in this country, reduce the output of others. Moreover, some types of work are characterized by considerable muscular fatigue. In these the work curve must be expected to fall considerably towards the end of the morning's work, to show a fair recovery after the mid-day break, followed by a progressive, well-marked fall throughout the afternoon. On the other hand, operations requiring skill and dexterity would be expected to show a work curve rising slowly in the morning to a maximal peak, as the worker settles to his work, followed by a less obvious fall (adaptation preventing or outweighing fatigue), a less complete recovery after the mid-day break (owing to loss of adaptation), and a smaller decline towards the end of the afternoon. Again, the work curve of operations characterized by rhythmical movements may be expected to show a good increase during the morning as the worker settles down to his rhythm, after which the output is relatively well-maintained throughout the rest of the day, provided that the hours of work be not excessive.

All these expectations have been verified in an inquiry conducted on behalf of the United States Public Health Service.<sup>19</sup> The stability of output occurring in the case of rhythmical work was found to be still greater in machine work, a steady rise occurring up to the third or fourth hour of the day, after which there was little variation in the rate of production. But, as would be expected, these curves varied in shape according as they were obtained from an 8-hour plant or a 10-hour plant, those from the latter showing a slower rise in the morning, and an earlier and greater fall throughout the afternoon.

*Characteristic Curve for Monotonous Work.* Attempts have been recently made to claim that a special form of curve is apt to appear in monotonous work,<sup>20</sup> the worker coming fresh to it at the start of the spell, then becoming bored with it and finally looking eagerly to its termination as the end of the spell draws near. The curve of monotonous work, if this claim be substantiated, falls in the middle of the spell and is higher on either side of it—thus being absolutely inverse in shape to the "normal" work curve which reaches its maximum not far from the middle of the spell of work.

*Effects of Working Conditions.* Lastly I must draw attention, however briefly, to the importance of such influences as lighting, humidity and temperature upon output.

The work of Wyatt, Weston and Elton<sup>21</sup> has shown that in the process of cotton-weaving the use of artificial light reduces output by 5 per cent, and that in the more delicate processes of silk and fine-linen weaving it reduces output by 10 and 11 per cent respectively.

In fine-linen and in cotton-weaving, Weston and Wyatt<sup>22</sup> have shown that

<sup>19</sup> U.S. Pub. Health Service, 1920, *Bulletin* No. 106.

<sup>20</sup> *Jour. Nat. Inst. Indust. Psychol.*, 1924, vol. ii, pt. 1, pp. 18-23.

<sup>21</sup> *Indust. Fatigue Res. Board, Reports* Nos. 9, 20, 23.

<sup>22</sup> *Ibid., Reports* Nos. 20, 23.

owing to the discomfort and fatigue of the weavers, efficiency falls when the wet-bulb temperature rises beyond about 73° F., despite the fact that a higher temperature and a higher degree of humidity are favorable from the point of view of their physical effects on the manufacture of the material.

The effects of temperature on output are indicated by the data of seasonal variations obtained by Vernon in the iron and steel industry and by Farmer, Brooke and Chambers in the glass industry.<sup>23</sup>

**The Complex Character of Fatigue.** I have said enough to indicate the impossibility of defining fatigue in a way satisfactorily for the application of any tests devised to measure it. The interpolation of a test inevitably introduces a change of attitude and a change of interest or the complication of some other feeling. The subject may be gratified, be annoyed, or, as is sometimes the case, apathetic, at being called away from his daily work to the test. He may be amused or alarmed at the apparatus which is applied to him or remain completely passive. Also, he may become bored with the test to which he is repeatedly submitted. Such influences, varying at different times and in different persons, cannot fail to affect the results of a test even when it is of such a character that the worker cannot voluntarily control his behavior to it, as is the case, for instance, in measuring cardiac, vascular, or respiratory activity. If, on the other hand, the test be opened to the voluntary control of the subject, e.g. a dynamometer test or a test of adding figures, dotting circles, or erasing a prescribed letter from printed matter, we are dependent almost entirely on the conscientiousness of the subject for our belief that he is always doing his best at the test.

If we continue to use (and it is almost impossible to avoid using) the term fatigue in industrial conditions, let us remember how complex is its character, how ignorant we are of its full nature, and how impossible it is in the intact organism to distinguish lower from higher fatigue, to separate the fatigue of maintaining attitudes, or to eliminate the effects of changing interest, excitement, suggestion, and the like. In industrial psychology, our hope lies rather in the study not of fatigue tests but of the curves of actual output, endeavoring to analyse the various influences at work and to observe, by the comparison of curves obtained under different conditions, how industrial efficiency may be improved.

<sup>23</sup> *Ibid.*, *Reports* Nos. 1, 5, 24.

### 3. Authorized and Unauthorized Rest Pauses in Clerical Work

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William McGehee  
Edwin B. Owen

Reprinted from *Journal of Applied Psychology*, 1940, 24, 605-614, by permission of the authors and of the American Psychological Association, Inc. An experimental study the results of which indicate that unauthorized rest can be reduced and production increased by authorized rest pauses even when the worker is made to pay for his rest by a longer working day.

Hersey (3), Vernon (6), and others have demonstrated that workers employed in light and heavy industrial work manage to take rest pauses even when such rest pauses are not authorized by the employer. The majority of investigators, as Viteles (7) points out in his excellent summary of the research on rest pauses, have indicated that authorized rest pauses increase both production and worker morale. However, it is generally assumed that authorized rest pauses are effective only when the time used for them is not added to the length of the day's work and the employee is not penalized in any way by the introduction of such pauses. In fact, Presgrave warns, "Do not make the worker earn his rest pauses, at least at the outset. If the operator is paid while resting, he will do much better while working." (4, 1524.)

Much of the data on rest pauses has come from the study of light and heavy industrial workers. No direct evidence is available that similar conditions prevail in the case of clerical workers. The present investigation has as one of its purposes to determine the extent of unauthorized rest pauses among clerical workers and their relationship to production. A second purpose of the investigation is to determine the effect on the amount of unauthorized rest and on production of the introduction of authorized rest pauses when the amount of time used for the authorized rest is added to the length of the working day. The present investigators realize that, as Roethlisberger and Dickson (5) have shown, production depends on other things than the nature of rest periods. The results and conclusions coming from this study are stated with this acknowledged limitation.

The subjects in this study were sixteen female comptometer operators employed in the North Carolina office of the Agricultural Adjustment Administration. The median age of the group was 22.5 years with a quartile deviation of 1.5 years and a range of 18 to 39 years. Two of the operators had

had no previous work experience before their present employment by the agency. All of the sixteen operators, however, were high school graduates and all but one of them had completed a twelve weeks' course in comptometer operation. The median experience of the group as comptometer operators was thirteen months with a quartile deviation of 7.5 months and a range of one month to 50 months.

These operators were all engaged in computing applications for crop loans. These applications were all very similar in nature and required similar amounts of work. A record of the number of applications worked by each operator each day was kept by the office manager. These records, with slight modifications as explained later, served as a basis for estimating production in this investigation.

The operators spent seven hours each day at work on the applications, five days a week. They worked only four hours on Saturday. The only official rest pause in the day's work was a 45 minute intermission for lunch. The operators, however, were not forbidden to leave the room in which they all worked during working hours, although the practice was discouraged by the office manager.

All observations throughout the experiment of unauthorized rest pauses taken by the operators were made by the junior author. He was, during and some time prior to the investigation, an employee of the agency and had his desk in the room in which the operators worked. His desk was located where he could easily see all the operators. He, therefore, was able to secure data on unauthorized rest pauses without any of the operators being aware of his mission. In order to facilitate the keeping of this record, he prepared, for each day of the experiment, a chart giving the names of the operators in code and dividing the working days into hour periods. On this chart, he marked down for each operator the time of day at which an unauthorized rest period began and the time at which it ended. From this record was computed the amount of time spent each day by each operator in unauthorized rest.

The criterion of unauthorized rest was taken as that of actual departure from the work room. The observer spent approximately two weeks prior to the period in which the data presented in this investigation were collected in perfecting his techniques of observation and in timing the duration of unauthorized rest pauses.

The authors believe that, due to the careful supervision of the operators, the criterion of unauthorized rest as stated in the preceding paragraph was adequate. In order to check this assumption, during the two weeks preceding the period of the actual experiment, the observer used a modified time sampling technique similar to that employed in the study of child behavior. He observed at ten minute intervals throughout an entire day the behavior of an operator and wrote down exactly what she was doing. Each subject in the study was observed in this manner for at least one day and records on five

subjects were obtained for two days. The data thus gathered seem to indicate that the time spent in unauthorized rest pauses was consumed in actual absences from the work room.

At the end of the two weeks devoted to perfecting the experimental techniques, observations, in the manner previously described, were taken for a two weeks' period in which the only authorized rest was the 45 minute noon recess. At the end of this period, the office manager announced that the following Monday rest periods, one from 10:22 to 10:30 A.M. and one from 2:23 to 2:30 P.M., would be inaugurated.<sup>1</sup> The manager explained that the time, 15 minutes, consumed by the rest pauses would have to be added to the working day. He explained the purpose of the rest pauses as being an effort to improve working conditions and urged cooperation from the workers. He also told them that he had made arrangements with a nearby drug store for refreshments to be sent which the operators could purchase during these periods if they so desired. The time added to the working day extended the working time from 4:15 P.M. to 4:30 P.M. on Monday through Friday and from 12:30 to 12:38 on Saturday.

It was believed best to allow the operators time to adjust to this new system of authorized rest pauses; no records taken for the week subsequent to the introduction of rest pauses, therefore, are used in this investigation. It is entirely possible that a week was too short a time for adequate adjustment, but due to the fact that the operators were soon to be put on different types of calculations, it was impossible to allow a longer adjustment period.

After the week of adjustment, the observer, for the two subsequent weeks, kept records of the amount of unauthorized rest under conditions of authorized rest, *i.e.*, 8 minute rest period in the morning and 7 minute rest period in the afternoon with a 15 minute longer working day. The procedure of making observations during this period was identical with that used during the two week period of no authorized rest pauses. In subsequent discussion of the results, the period of no authorized rest pauses is designated as the first period and the period of authorized rest pauses as the second period.

Table 1 presents a comparison of the amount of time spent in unauthorized rest periods by the sixteen operators during the first and second periods of this investigation. The time spent by each operator in unauthorized rest has been reduced to the average number of minutes spent in unauthorized rest per hour worked. This seemed a preferable way to present the data rather than in terms of time per day, as in two days in each of the periods, the operators worked only four hours.

It is obvious from these data that less time is consumed in unauthorized rest by operators under conditions of authorized rest than under conditions

<sup>1</sup> Rest pauses were located at these times on the basis of a study of the time at which unauthorized rest was most frequently taken.

TABLE 1. A COMPARISON OF THE TIME SPENT IN UNAUTHORIZED REST UNDER CONDITIONS OF UNAUTHORIZED AND OF AUTHORIZED REST PAUSES. TIME GIVEN IN TERMS OF MINUTES SPENT BY EACH OPERATOR PER HOUR WORKED IN UNAUTHORIZED REST \*  
(16 SUBJECTS)

Period	Mean	$\sigma$	$\sigma_M$	$\text{Diff.}_{M_1 - M_2}$	$\sigma_{\text{Diff.}}$	C.R.
First.....	3.01	0.71	0.18	1.80	0.20	9.00
Second.....	1.21	0.83	0.21			

\* The following formula has been used in computing  $\sigma_M$ ;  $\frac{\sigma}{\sqrt{N-1}}$ . In computing  $\sigma_{\text{Diff.}}$ , the formula  $\sqrt{\sigma_{M_1}^2 + \sigma_{M_2}^2 - 2r_{12}\sigma_{M_1}\sigma_{M_2}}$  has been used as the  $r$  between unauthorized time spent in rest pauses in the first and second periods is .50. See (2) in bibliography.

of no authorized rest. It would seem, then, that it would be advantageous to introduce rest pauses under the conditions of this experiment if the sole purpose of such a policy were to reduce the amount of unauthorized rest.

One of the problems of this investigation is to determine the effect on production of the introduction of rest pauses under the conditions of adding the amount of time spent in such pauses to the working day. Records of production of the operators in terms of number of applications worked per day by each operator were secured from the office manager for both the first and second period of the investigation. The average number of applications computed per hour by each operator was calculated.

Although the applications were very similar, it was thought that some difference in those computed in the first period and second period might exist. Accordingly, a correction formula, based on the analysis of the applications worked, was derived and this formula was used to equate the relative difficulty of the applications worked in the different periods. The number of applications worked as reported in subsequent tables are the number worked in terms of the use of the correction formula. There is, of course, some source of error in making such a correction; however, the errors, if they do exist, are very small and would not influence the results of the investigation.

Table 2 presents a comparison of the production of the operators, after the corrections were made as described in the preceding paragraph, for the first and second period of this investigation. It is apparent from the data in Table 2 that the actual number of applications computed per hour under conditions of authorized rest pauses in this investigation is greater than that when no authorized pauses are allowed. The C.R. is almost twice as large as that which is commonly accepted as indicative of statistical reliability.

TABLE 2. A COMPARISON OF THE PRODUCTION IN TERMS OF APPLICATIONS COMPUTED PER HOUR PER OPERATOR UNDER CONDITIONS OF UNAUTHORIZED AND OF AUTHORIZED REST PAUSES \* (16 SUBJECTS)

Period	Mean	$\sigma$	$\sigma_M$	$\text{Diff. } M_2 - M_1$	$\sigma_{\text{Diff.}}$	C.R.
First.....	20.38	7.34	1.90	5.81	.98	5.92
Second....	26.19	8.78	2.27			

\* See footnote to Table 1 for formulae used in computing  $\sigma_M$  and  $\sigma_{\text{Diff.}}$ . The  $r$  between production in the first and second period is .79.

It would seem, then, that rest pauses which are authorized, although the time consumed by them is added to the length of the day's work, result both in a decrease in the amount of unauthorized rest and an increase in the amount of production. In order to determine the reaction of the operators to the policy of authorized rests, a questionnaire was submitted to the group. This questionnaire was presented by the office manager at the end of the second period with the explanation that he desired the opinion of the operators regarding the policy of authorized rest pauses. The operators were instructed not to sign their names and that no attempt would be made to identify the respondents. The questionnaire is reproduced below with the number of operators giving each answer to each of the questions.

In general, the answers to the questionnaire indicate that the operators were not very favorably disposed toward the policy of authorized rest pauses as used in this investigation. Only six of the sixteen operators approved them while nine would prefer to return to the former system of unauthorized rest. The responses to questions five and six are not consistent with the general trend of the responses to the other questions.

A possible explanation of this inconsistency is found in the complaints about the crowded condition of the rest room during the authorized rest pauses. This explanation gains force in view of conversations held with the operators by the junior author in which he found the principal complaint was concerning the crowded rest room. It would seem, then, that the unfavorable attitude of the operators toward authorized rests, as defined in this study, was not directed so much against the addition of 15 minutes to the working day as against certain conditions surrounding the rest periods.

The number of subjects in this experiment precludes any significant results from correlational analysis of the data. It is interesting to note, however, that there is a rank order difference correlation between production and amount of time spent in unauthorized rest of  $-.54 \pm .13$  during the first period of this investigation. This correlation was reduced to  $-.34 \pm .16$  in the second period.

TABLE 3. QUESTIONNAIRE SUBMITTED TO OPERATORS AND SUMMARY OF ANSWERS

(Numerals indicate number of operators making each answer)

Please answer the following questions by checking (✓) what you consider to be the correct answer. Do not sign your name.

1. Do you approve of the recently started system of a specific period for rest?

Yes.....	6
No.....	7
Uncertain.....	3

2. Do you prefer scheduled rest periods to taking time out for rest at no specific time?

Yes.....	6
No.....	10
Uncertain.....	0

3. Would you like to return to the former system of having no specific rest periods?

Yes.....	9
No.....	6
Uncertain.....	(1 no answer)

4. Do you believe that specified rest periods are an undue interference with your personal freedom?

Yes.....	2
No.....	13
Uncertain.....	1

5. Do you believe the specified rest periods are a good thing when the time taken out for them has to be added (due to government regulations) to the working day (i.e., quitting at 4:30 instead of 4:15)?

Yes.....	12
No.....	4
Uncertain.....	0

6. Do you believe the specified rest periods would be more satisfactory if the time consumed by them was not added to the working day?

Yes.....	5
No.....	8
Uncertain.....	3

7. How would you describe the efficiency of your work under the present system of fixed rest periods as compared with the former system of no fixed rest periods?

More efficient.....	5
Less efficient.....	1
Of the same efficiency.....	10

8. How would you describe your degree of tiredness at the end of the day's work under the present system of fixed rest periods as compared with the previous system of no fixed rest periods?

More tired.....	0
Less tired.....	5
No difference.....	11

TABLE 3 (Continued)

9. Would you be in favor of lengthening the rest periods to 10 minutes each, with the time added on to the working day?

Yes.....	2
No.....	12
Uncertain.....	2

10. Do you think the rest periods are sufficient to take care of all the necessary time out of the room?

Yes.....	7
No.....	8
Uncertain.....	1

In a few words, describe as well as you can your personal reaction to the present system of fixed rest periods. Give any unfavorable criticisms, favorable comments, or suggestions for improvement you may have.

- 7 mentioned crowded rest rooms as an objection.
- 3 approved of the present system.
- 6 gave no answer.

It was not possible, due to government regulations, to perform the crucial experiment in this investigation, *i.e.*, a system of authorized rest pauses, without increasing the length of the working day. In industrial work, there is evidence that this would bring increased production. There is some evidence that the same condition might prevail in the case of clerical workers from an investigation made in the offices of the T. V. A. Authority (1). This study shows an increase of 3 per cent in the volume of work done by classifiers, a reduction of 50 per cent in filing errors, and an increased group morale with the introduction of rest pauses which decreased the actual working time 6 per cent.

The results of the present investigation, within the limits indicated in the description of the procedures used, seem to indicate that both unauthorized rest can be reduced and production can be increased by authorized rest pauses even when the worker is made to pay for his rest by a longer working day. They further indicate that conditions under which the authorized rest is taken must be made as free from sources of irritation as possible if the worker is to accept the policy without undue dissatisfaction. Finally, the results indicate that, in clerical as well as in industrial work, employees secure rest pauses even if they are not specifically granted by the management.

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#### 4. Music in a Complex Industrial Job

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William McGehee  
James E. Gardner

Reprinted from *Personnel Psychology*, 1949, 2, 405-417, by permission of the authors and of Personnel Psychology, Inc. The majority of published reports of the effects of music upon job performance are impressionistic and nonquantitative. An exception is this controlled experiment in which the authors investigated both the effects of music on the amount of production and the way workers believe the music affected their job performance.

**The Problem.** Industrial music has been used widely in American Industry. The exact extent of its use is not known but a recent report (4) estimates that there are as many as 6,000 industrial installations in the United States. In spite of the wide use of industrial music there are few control studies of its effect on the workers and on the performance of their jobs. Too often the effect of music on production, absenteeism, turnover, accident rates, and workers' attitudes is "measured" in terms of the optimistic beliefs concerning its effectiveness held by those responsible for its installation and programming.

The majority of investigators agree that the increase in production attributed to music comes not from rhythmic pacing but from the salutary effects music has on workers' attitudes. For example, Smith writes, "Music can increase production only through stimulating changes in the attitudes or behavior of the employees. Improvements in production are by-products of these changes" (3, p. 54). It is implicit also in much writing on the subject of worker productivity that improved attitudes will result in increased worker productivity. Following this line of reasoning, if music improves attitudes

towards work, it should also increase production. This study is designed to investigate certain aspects of the following problems:

1. What is the effect of introducing music on the amount of production of industrial workers?
2. What are the opinions of the workers in regard to the effects of music on their work behavior?
3. What relations exist between the effect of music on production and the opinion of workers as to the effect of music on their work behavior?

The writers are aware that the results reported here may be peculiar to the work situation in which this study has been carried on.

This study should be of interest also in that the conditions under which it was conducted differed from those surrounding two of the better controlled studies of industrial music. Both Kerr's (2) and Smith's (3) studies involved workers performing relatively simple industrial tasks. The work required of the subjects in this study is relatively complex as industrial jobs go. Smith's investigation was conducted during a period of industrial expansion, employee training, and war enthusiasm. The present investigation was made in a stable work situation. All employees were experienced workers; production demands were stable; wages were based on an incentive system which had been in operation for several years without modification; there had been no change in supervision for three years. In other words, the study was made in a relatively stable work situation on workers fully familiar with their jobs and reasonably well adjusted to the social environment of the work situation.

Both Kerr and Smith reported increases in the amount of production associated with the use of music. The former, it is true, based his conclusions on consistent rather than statistically reliable differences in favor of music. The findings in this study concerning production are not in agreement with the results obtained by Kerr and Smith. This is not to imply any inaccuracy in their work but rather to point up the fact that a different situation can lead to different results. It may serve as an antidote to the practice of making generalizations from a sample of behavior to a universe.

**Subjects and Jobs.** The subjects involved in this study are 142 women workers employed in the occupation known as "setting" in rug manufacturing. Eighty-two of these operators worked on the first shift, 60 on the second shift. The index of production used in this investigation is the average hourly output of these workers based on the units established by careful time study.

The task of "setting" is a relatively complex industrial job. It involves the preparation of material for rug looms. The time required to reach the minimum skill where the worker is at a breakeven point between pay and production ranges from six to 15 months. Two to four years of experience are required to become a skilled operator. Without describing the job in

*Fatigue and Worker Efficiency*

TABLE 1. AVERAGE HOURLY PRODUCTION FOR EACH DAY, IN TERMS OF WEEKS, PROGRAMS, AND SHIFTS

Week	Shift	Program	Monday Production	Tuesday Production	Wednesday Production	Thursday Production	Program	Friday Production
1	1	A	133	B	139	C	140	145
	2		123		120		124	111
2	1	B	136	C	141	D	146	139
	2		115		119		122	115
3	1	C	140	A	138	E	139	107
	2		114		116		121	
4	1	D	129	E	132	A	136	140
	2		120		126		118	114
5	1	E	132	D	144	B	142	142
	2		114		122		123	118

detail, its complexity can be indicated by stating that skilled workers must have a high level of mental and manipulative skill; they must be able to attend to numerous job demands; they must possess high visual memory and color discrimination. The job also requires considerable physical endurance since it involves constant standing and walking. It also requires that the workers make an adjustment to a partner, since the work is performed by pairs of operators and pay is based on the output of the pair.

**Music and Production.** The writers are indebted to both Smith and Kerr for the methods used in studying the effect of music on production in this study. The effect of music on production was studied by the comparison of the amount of production on days on which music was played with the amount of production on no-music days during an experimental five-week period. The following procedure was used in making this comparison. The experimental period was begun one week after the installation of music. This week was used for the purpose of ironing out difficulties in music equipment and in programming. During each of the five weeks of the experimental period, music was played four days and was not played one day.

Four distinct music programs were used on each of the music days in a week. The amount of music played each day during actual work hours was the same, 80 minutes. The type of music played during the work hours, opening period, and lunch period was identical in each music program. It followed recommendations for programming industrial music made by Benson (1). The programs differed, however, in the amount of music played in individual work music periods and in the use of music for opening, closing, and lunch periods.

There were, therefore, four music programs (A, B, C, D) and one no-music program (E). These programs were rotated during the five-week period so that no one program was played on the same day twice. This rotation was planned to minimize the effect on production arising from possible daily and weekly variations. It allowed, also, for rigid statistical test of any differences found in terms of the effect of music, of no music, of weekly variations in production and of daily variations in production. This test is described in the technical section of this report.

Table 1 gives the arrangement of programs and the average hourly production by weeks, days, shifts, and programs during the experimental period. Table 2 gives the average hourly production for weeks, days and programs by shifts. An analysis of these data shows no significant differences in production which can be attributed to any music program, to the lack of music, or to variations in weekly or daily production. In other words, the only possible conclusion is that during the experimental period industrial music had neither a favorable nor unfavorable effect upon the production of these workers as a group. It is possible that the production of the individual workers may have shown greater variation with music than without it. These data,

TABLE 2. AVERAGE HOURLY PRODUCTION FOR DAYS, WEEKS, SHIFTS, AND MUSIC PROGRAMS

Shifts	Weeks				
	1	2	3	4	5
1	139.4	141.0	139.6	134.8	142.0
2	118.4	118.0	115.6	118.8	120.2
Days					
	Mondays	Tuesdays	Wednesdays	Thursdays	Fridays
1	136.0	138.8	140.6	140.7	140.4
2	117.2	119.4	120.5	120.1	113.0
Programs					
	A	B	C	D	E
1	138.0	139.0	139.0	139.0	141.0
2	119.0	117.0	117.0	118.0	119.0
				Music	No Music
				139.0	141.0
				118.0	119.0

however, have not been analyzed to determine the nature of individual differences. It is doubtful if this would be a fruitful procedure since the employees worked in pairs.

Production considerations made it advisable not to extend the experimental period beyond five weeks. It is possible that a longer period of adjustment might have been necessary before the maximum influence of music on production could be realized. A comparison, however, was made between production during a five-week period subsequent to the experimental period and production during a five-week period immediately preceding the installation of music. While this procedure does not allow for careful statistical control of the effect of daily and weekly variation and other factors influencing production, it is interesting to note that the difference in average production between these two periods is not statistically significant. The average hourly production (both shifts) for the five-week period prior to music was 130.8 while for the five-week period with music subsequent to the experimental period, aver-

age hourly production was 131.0. It seems unlikely, therefore, that an extension of the experimental period would have revealed any significant differences in production that could be attributed to the presence or absence of music.

**Employees' Opinions of the Music Program.** Music, then, had no favorable or unfavorable effect upon the production of these workers as a group. This failure to have any effect on production might be traceable to the employees' like or dislike of the music program. Accordingly, we developed a questionnaire to be administered to these workers to determine first, their general reaction to the music program and second, to determine how the employees felt that music affected their work. The questions used in the questionnaire were based on data collected from intensive preliminary interviews with 14 members of this department. These workers who were interviewed were selected at random.

The questionnaire was administered to the entire group. However, due to absenteeism and to a few returned questionnaires which were unusable, there were only 130 questionnaires which could be analyzed. In other words, the results which are to be reported represent the opinion of slightly over 90% of the workers in this department. The results of this questionnaire indicate clearly that the workers were favorably disposed towards the music program. In reply to a question, "Do you want us to continue playing music in this department?", 84.5% answered in the affirmative. Only 1% answered in the negative, while 14.5% indicated that it made no difference to them whether or not we continued the music.

When asked about the specific aspects of the music programs such as the type of music used and its programming, the answers in the main were favorable. The major complaint that we received regarding the type of music played was that we were playing too much semi-classical and Latin music, and not enough hymns.

The music program, then, was received favorably by the majority of the workers. Yet, as indicated above, it had no effect on the amount of production. We, therefore, asked on the questionnaire the specific question, "What effect does music have on your work?" The checklist which was submitted to the group was again based on our preliminary interviews. Table 3 gives a summary of how music seemed to affect the job performance of these workers. In general, music seemed to reduce monotony, to make time pass more rapidly, and to make the work easier. It is interesting to note, further, that 59 per cent of the group said they got more work done with music as compared with a negative response of seven per cent. The opinion of the workers that music helps them to produce more is extremely interesting in view of the fact that there was no increase in measured production.

As indicated, the rank and file employees in this department were favorably disposed toward the music program and felt that it helped their work.

TABLE 3. WORKERS RESPOND TO QUESTION, "WHAT EFFECT DOES MUSIC HAVE ON YOUR WORK?"—*N* = 130

Reported Effects	Per Cent Responding		
	Yes	No	Can't Tell
A. Makes time pass.....	90	3	7
B. Takes your mind off other things.....	74	14	12
C. Gives you a lift when you're tired.....	86	4	10
D. Makes you feel more like coming in.....	74	6	20
E. If you come in feeling bad, music helps.....	82	5	13
F. Music keeps work from getting on nerves.....	73	6	21
G. Music gives you something to look forward to.....	75	5	19
H. The hard patterns seem to come easier with music....	49 *	14	37
I. You get more work done with music.....	59	7	34
J. Music lets you know how much time has passed.....	65	6	28
K. Music helps you know if you're behind or ahead in your work.....	49 *	10	41
L. You move in time with the music.....	54 *	18	28
M. Music breaks monotony.....	73	4	23
N. You do less talking with music.....	80	5	15
O. You seem to have more pep with music.....	77	6	17
P. Interferes with your work.....	4	74	21
Q. Makes you nervous.....	6	75	19

\* Differences between percentage answering "yes" and combined percentage answering "no" and "can't tell" are *not* statistically significant. Remaining differences between "yes" and other responses are statistically significant.

We secured a similar reaction to the music from the supervisors. This was secured through a questionnaire issued separately to supervisors at the same time we issued the questionnaire to the workers. The items in this questionnaire were based again on information secured in informal interviews with these men.

Returns were secured from the total supervisory force in the Setting Department, five foremen and assistant foremen. In addition, returns were received from two supervisors in a small department adjacent to the Setting Department in which the same music was played. Since it was desired to give these supervisors complete anonymity in making their replies to the questionnaire, no attempt was made to keep the two departments separate.

Table 4 gives a compilation of the responses from both the departments to the questionnaire.

TABLE 4. QUESTIONNAIRE ON EFFECTS OF MUSIC ADMINISTERED TO SUPERVISORS AND NUMBER REPLYING  
(N = 7)

	Im- proved	Become Worse	No Differ- ence	Can't Tell
Employees' gripes and complaints.....	5	0	0	2
Employees' attitude towards Company.....	4	0	1	2
Employees' attitude towards their work....	5	0	1	1
Employees' cooperativeness.....	4	0	3	0
Employees' dependability.....	1	0	4	2
Quality of employees' work.....	4	0	2	1
Employees' relationship with supervisors...	4	0	1	2
Employees' relationship with each other...	5	0	0	2
Your satisfaction in your own work.....	6	0	0	1
The general spirit in your department.....	7	0	0	0

These responses indicate that the supervisors believed that the music improved employee attitudes, gave the employees' morale a lift, created better interpersonal relations, and increased job satisfaction among the supervisors themselves. The supervisors believed further that music had made their duties easier to handle. All of them wanted music continued; all except one of the supervisors believed that music was a worthwhile investment in their department. In other words, these supervisors believed that music had definitely improved the attitude of their workers as well as their own attitude toward their job.

**Implications.** As shown above, there is evidence that the employees in this study were favorably disposed towards music. We have, further, evidence that they believed that music not only made the work more pleasant but, also, that it increased their actual production. On the other hand, within the limitation of the experimental design, we have evidence that there was no statistically significant change in the amount of production.

As indicated earlier, it has been implicitly assumed by most writers on the problems of workers' attitudes, that an improvement in the attitudes of workers and a reduction in the monotony of the task would tend to increase production. Music, as a non-financial incentive, is assumed to increase production by bringing about changes in the attitudes or behavior of the employees (3, p. 54).

Smith further has suggested that "the more complex and varied the job, the less likely music is to increase production on it" (3, p. 55). The reasoning here is that if the job is so complex that it requires the full attention of the employee, he will not attend to the music and the music will have no effect on his production. It might also be implied that if the job is so complicated that it requires the full attention of an employee music might serve as a distracting element and thus reduce production.

The task which the employees in this study performed is a complex one. It is possible that the failure of music, in this study, to increase production can be attributed to the fact that the entire attention of these workers was devoted to the job demands. This does not seem, however, to be the case. Both through observation and interviews with employees we have evidence that, in spite of the complexity of the task, workers were strongly aware of the music and that they sometimes hummed the tunes or sang the words of the music. The answer to the questionnaire items themselves indicate that music received considerable attention from the workers. It seems, therefore, that the failure of music, in this study, to increase production cannot be attributed to the failure of the employees to attend to the music due to the complexity of their tasks. Further, attention to music did not result in any significant loss in production.

It seems to us, therefore, that an alternate hypothesis must be advanced to explain the failure of music within the limits of this study to increase or decrease production. The workers in this study over a long period of time have reached relatively stable levels of production. They have developed definite habit patterns of work and tempo of work. Further, they have developed a fairly adequate adjustment to the social and task demand of this work situation. It seems, therefore, in this very stable situation that the effect of music was not sufficiently strong in spite of its other salutary aspects to break up these well established habit patterns. While some of the workers used music as a pacing device, *i.e.*, as a means of knowing whether they were behind or ahead in their work, the music did not change their production goals. These workers, therefore, seem after long experience on this complex job to have reached a stable level of production. This level may have been arbitrarily established by the workers or may represent a physiological limit. In any case, it is apparently so strongly established that it was not affected by music despite the favorable reactions of the workers toward the music. Moreover, it seems that workers' opinions regarding the effect of music on their own output cannot be taken as evidence of the actual effect.

As indicated earlier, the production of individual workers may have been favorably or unfavorably affected by the music. Due to the nature of the task, it is impossible to determine whether or not this is so. If it were so, favorable effects on one worker are masked or cancelled by unfavorable effects on other workers.

**Technical Section.** The programs of no music and music during the experimental five-week period was so designed that the data could be analyzed by means of the Latin square analysis of variance technique. On the basis of the data in Table 1, we made a separate analysis for each shift. The analysis of variance data are shown in Table 5. In no instance is the F ratio statisti-

TABLE 5. ANALYSIS OF VARIANCE DATA AND F RATIOS BASED ON PRODUCTION DURING FIVE WEEK EXPERIMENTAL PERIOD

	First Shift			Second Shift		
	SS	DF	S <sup>2</sup>	SS	DF	S <sup>2</sup>
Source.....						
Programs.....	33.76	4	8.69	15.2	4	3.80
Weeks.....	97.76	4	24.44	66.0	4	16.50
Days.....	84.56	4	21.14	212.4	4	53.10
Error.....	165.48	12	13.79	206.4	12	17.20
Total.....	381.76	24		500.0	24	

F Ratios \*

	First Shift	Second Shift
Programs $\times$ errors.....	0.630	0.221
Programs $\times$ weeks.....	0.356	0.230
Programs $\times$ days.....	0.411	0.072
Weeks $\times$ days.....	1.156	0.311
Weeks $\times$ error.....	1.772	0.959
Days $\times$ error.....	1.533	3.087

\* None of the F ratios is significant at the 5% level.

cally significant. This rigorous statistical test substantiates our earlier conclusions that production was not materially increased or decreased by the music, type of program, or absence of music during the experimental period.

We have tested the significance of differences between the percentages (Table 3) of those saying "yes," "no," and "can't tell" to the questionnaire items. In every instance except three, the differences are statistically significant between the percentage answering "yes" and the combined percentage for "no" and "can't tell." In these three instances the differences are statistically

significant at the one percent level between those who say "yes" and those who say "no."

Statistical treatment of our data, therefore, substantiates the conclusions drawn earlier in this study that music had no effect, favorable or otherwise, upon production of this group of workers. The workers, however, were favorably disposed toward the music and believed that it favorably affected their job performance. We have no experimental verification of our hypothesis, however, that music failed to affect production favorably in this situation due to the long established habit patterns of work in a stable work situation.

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## 5. Industrial Noise and Hearing

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Robert B. Sleight  
Joseph Tiffin

Reprinted from *Journal of Applied Psychology*, 1948, 32, 476-489, by permission of the authors and of the American Psychological Association, Inc. A comprehensive review of the literature from which the authors conclude that the greater quantity of experimental evidence indicates that there are many circumstances wherein noise is deleterious. A course of action is suggested for the employer who is confronted by the noise problem.

Industrial noise has increased steadily with growth in mechanization. As an undesirable feature of the industrial environment, noise today is of increasing concern to many groups. There is some evidence that in the industrial situation noise is a contributing factor to inefficiency, fatigue, lowered morale, absenteeism, accidents, and labor turnover. Probably, however, the most incontestable evidence is that industrial noise contributes to deafness. It is the purpose of this article to summarize certain published studies on the relation

of noise to impairment of hearing, and to note the possible implications of the findings from the standpoint of compensation for the resultant disability.

Generally conceded to mean any unwanted sound, noise has been rather thoroughly studied. In order to study noise and its effect, it is necessary to measure it. Its accurate measurement, *i.e.*, determination of its intensity and composition, is now possible. Intensity is most often measured by a sound-level meter. This is an instrument having a microphone which is placed in the noise field. The resultant electrical current output of the microphone is then indicated on a calibrated decibel scale. The intensity is usually expressed in terms of the decibel, a unit which may have its zero point standardized at approximately the least sound that can be heard by the "normal" ear. The composition of a noise is essentially determined by an analyzer which indicates the intensity of the frequency components of the complex sound. Dependable noise measurement is not a simple process and usually requires the services of a skilled acoustic technician.

Hearing, related as it is to noise and being an integral part of the health of the industrial worker, must be precisely and accurately measured. An instrument designed to do this measuring of a person's auditory acuity is the audiometer. Important in making adequate hearing measurements, in addition to the audiometer, are a sound-proofed testing room, or at least a room in which the ambient noise is low and stable, and the services of suitably trained technicians.

Noise and hearing measurement, although requiring some equipment and trained personnel, is not very expensive and may be highly desirable, especially in "noisy" industries.

**Noise and Production.** Several surveys and experiments, *e.g.* (27, 34, 46), have tended to substantiate the belief that noise contributes to inefficiency and reduced productivity. Although there is a dearth of dependable "before and after" production figures available, the bulk of extant evidence shows noise to be deleterious to production. The studies that have been made assume significance in the accumulation of facts which indicate that even workers who are accustomed to working under noisy conditions still show increase in production when noise is reduced. Kerr (25) and Poffenberger (36), however, have reported that music may in some cases increase production. It appears, then, that some carefully controlled research is needed to ascertain the exact relation of noise to attention and this in turn to efficiency.

**Indirect Effect of Noise on Workers.** In addition to the direct effect of noise upon workers as evidenced by production, the indirect influence may be of "dollars and cents" value to industrial management. What is the possible contributory influence of noise to employee morale, absenteeism, labor turnover, accident rate, etc.? In some of the pertinent reports found in the literature (3, 6, 7, 40) there is extensive evidence that noise tends to influence these factors adversely. Most often reported in the employees' responses to

noise reduction is the increased "ease of talking" which, it might be readily agreed, improves the attitudinal outlook of the employee and increases his overall satisfaction.

**Noise and Deafness.** The most convincing argument for reduction of noise in industry is the effect of noise on hearing. The literature dealing with the relation of auditory stimulation by industrial noise to hearing extends back at least as far as Fosbrooke's article (15) *Pathology and Treatment of Deafness*, published in 1831, in which he called attention to the prevalent deafness in blacksmiths. A thorough résumé and discussion of the early literature on

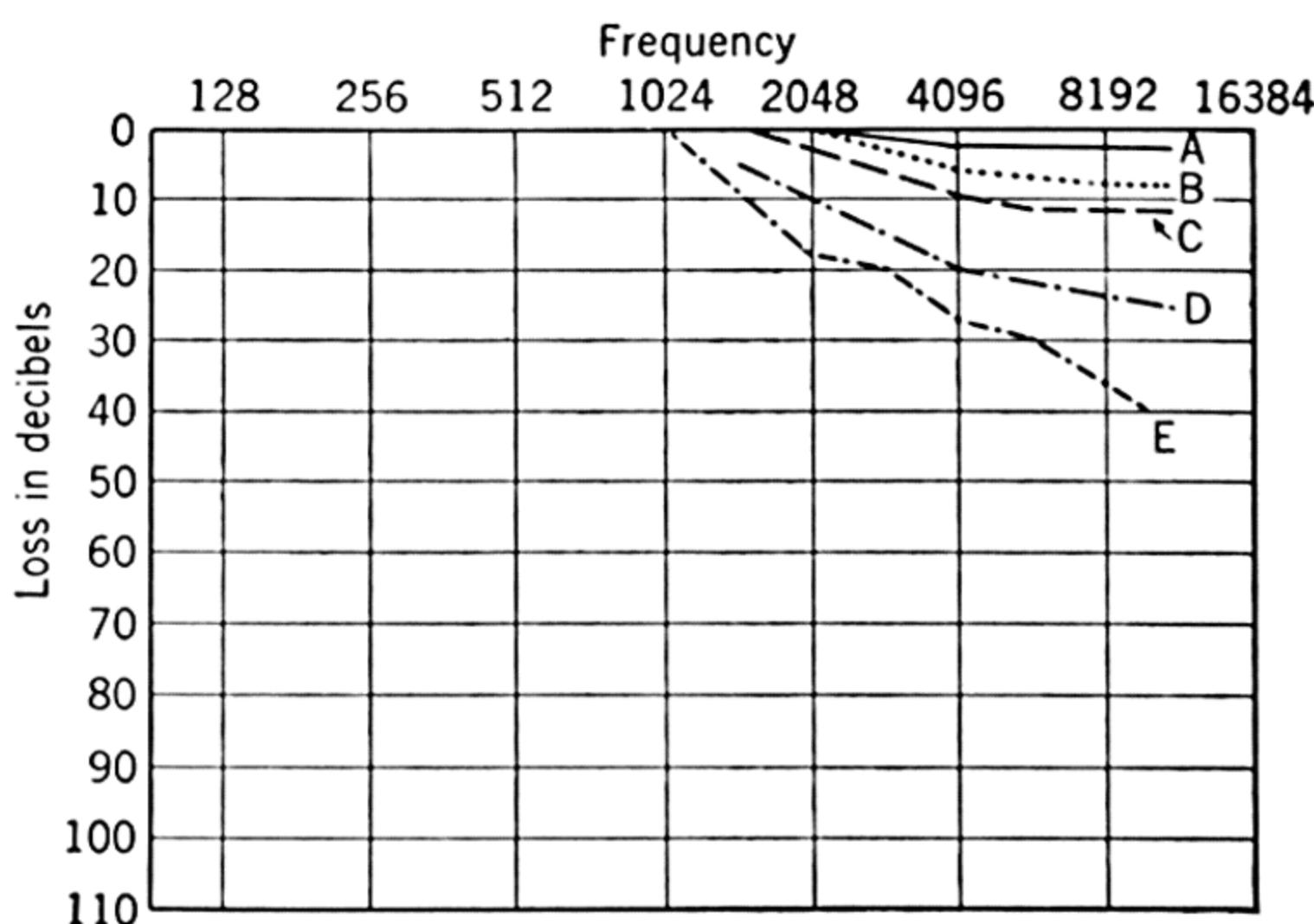


FIG. 1. Normal decrease in hearing acuity with increasing age. From Gardner (16): A = 10-19 years; B = 20-29 years; C = 30-39 years; D = 40-49 years; and E = 50-59 years.

the influence of industrial noises, previous to 1914, can be found in an article by Gilbert (17). Another rather complete account bearing directly on the deafness problem is *A Critical Review of Experiments on the Problem of Stimulation Deafness*, published in 1935 by Kemp (24). In 1946, Berrien (2) published a general review, under the title of *The Effects of Noise*, covering such aspects as effects on production, influence on vital processes, adaptation to noise, etc.

**Recent Studies.** Among the more recent studies on noise relevant to hearing in industry is a rather comprehensive one reported by Gardner (16) in which the hearing of shipyard workers was tested and the results compared with other groups.

In Figure 1 is shown an audiogram (a graphic record of auditory sensitivity) of the normal decrease in hearing acuity with increasing age. This variation of hearing with age is a natural phenomenon which should not be discounted when considering apparent hearing losses of adults. Gross discrepancies between the curves shown in Figure 1 and various subsequent audiograms indicate that some unnatural element is causative of hearing loss.

Figure 2 displays the principal data obtained by Gardner (16) and may be compared with Figure 1 so that magnitude of hearing loss, with attention given to age, will be apparent for those workers who represent the shipyard working group.

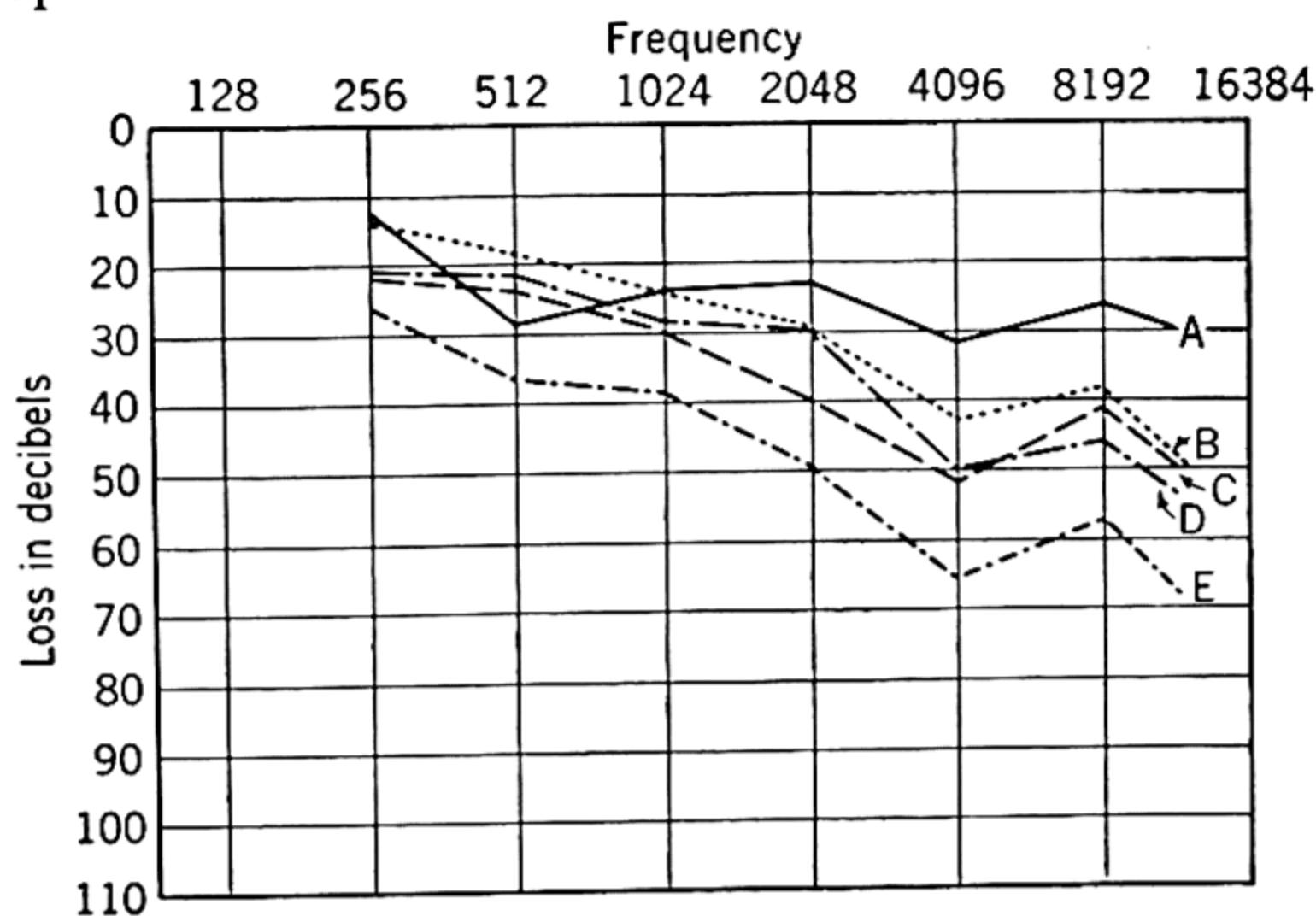


FIG. 2. Average hearing loss of 296 shipyard workers according to age. From Gardner (16): A = 16-20 years ( $N = 28$ ) ; B = 21-30 years ( $N = 92$ ) ; C = 31-40 years ( $N = 120$ ) ; D = 41-50 years ( $N = 44$ ) ; E = 51-65 years ( $N = 12$ ).

Another study on the relationship between noise level of the working environment and deafness was made by Rosenblith (38). Because of the high noise-level encountered in a boiler factory (about 110 decibels average) (1),

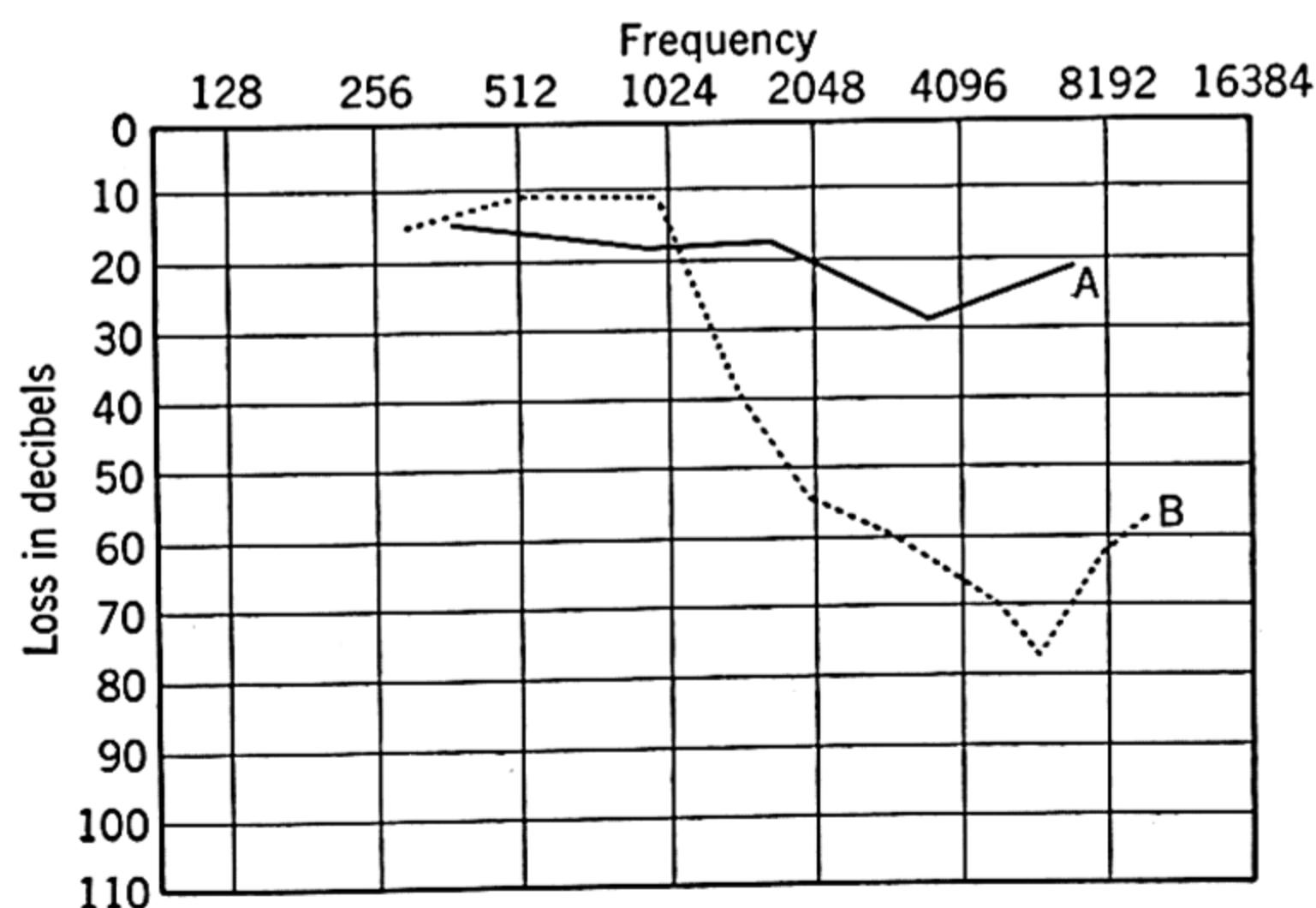


FIG. 3. Comparison between "normal" and industrial hearing loss. From Rosenblith (38): A = a World's Fair group, 40-49 years; and B = boilermakers, average age 45 years.

the main data were gathered there. In Figures 3, 4, and 5 these audiograms indicate clearly the damaging effect on hearing resulting from working in a noisy environment. Figure 3 specifically compares the hearing loss among

boilermakers to a group of "normals" (as measured by the Bell Telephone Laboratories at the 1939 World's Fair). It is particularly important to note that the groups shown are for all intents and purposes equated on the age

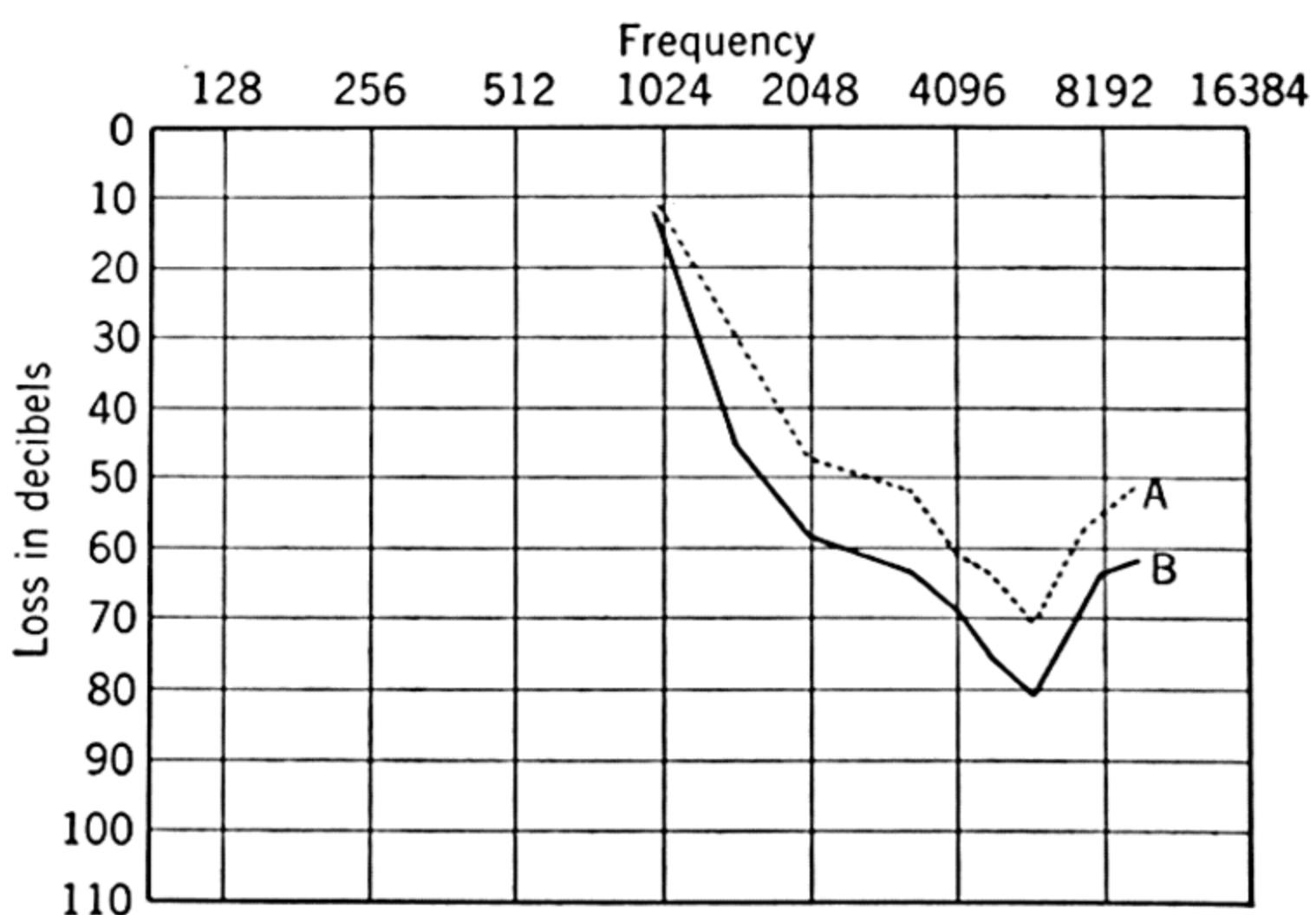


FIG. 4. Hearing loss among boilermakers according to time on the job. From Rosenblith (38): A = 15-20 years on the job; and B = 20-25 years on job.

factor. Figure 4 shows the degree of hearing loss of workers relative to their tenure on the job. Figure 5 makes possible visualization by the reader of the relationship between the average noise level and the hearing losses. In

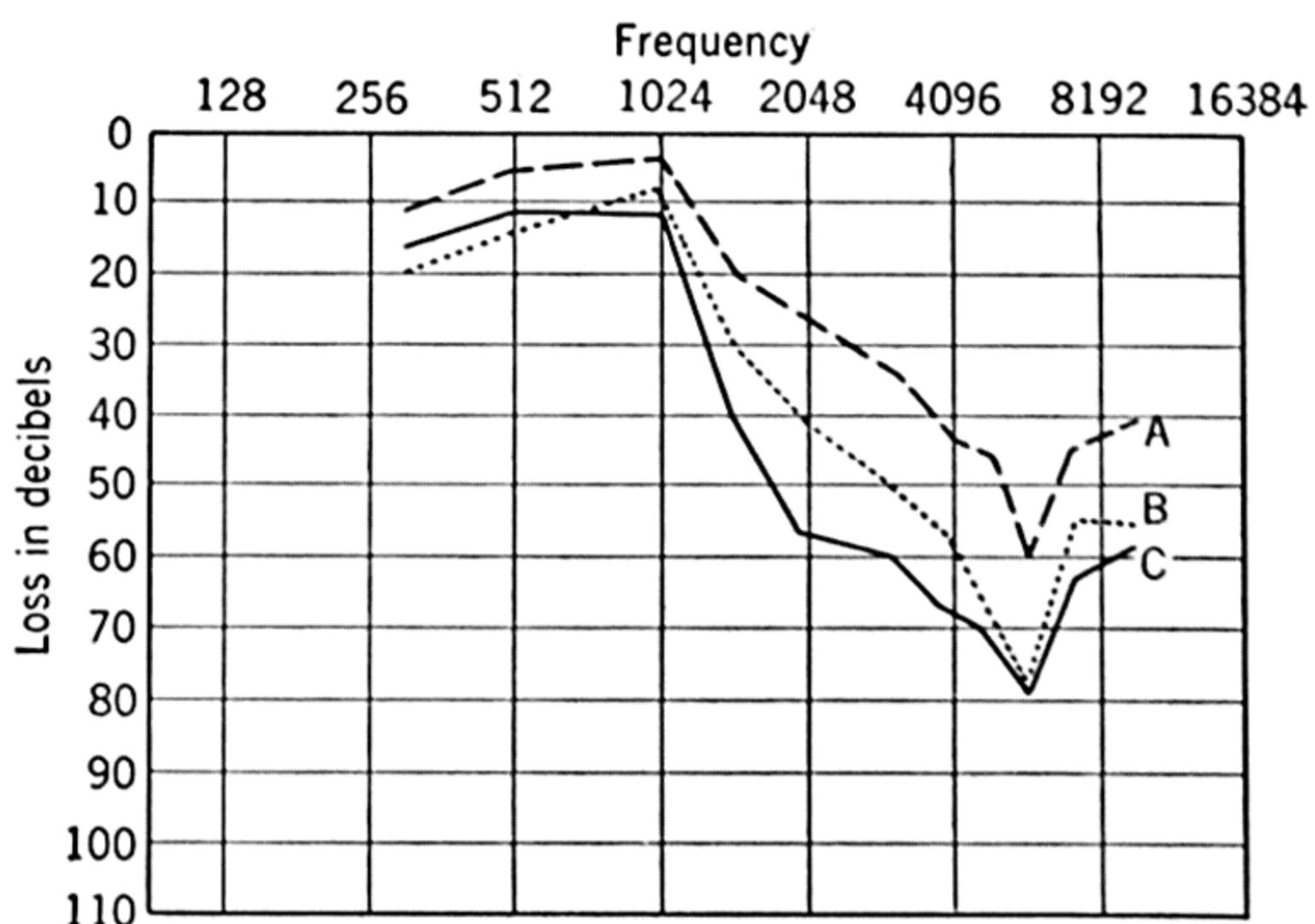


FIG. 5. Hearing loss among various categories of personnel after 15 years of employment in a boiler factory. From Rosenblith (38): A = machinists (average noise level, 75 db); B = blacksmiths (average noise level, 80 db); and C = boilermakers (average noise level, 90 db).

addition, this figure shows how the hearing loss is almost completely localized in the region above 1000 cycles with the maximum loss occurring at about 6000 cycles.

In addition to the data presented in these audiograms Rosenblith reported the following findings from a survey in which the same shipyard workers were tested before work (in the morning) and again after work (in the evening): 75% showed greater hearing loss in the evenings; 19% were the same morning and evening; and 6% were better in the evening. These percentages point out at least a temporary loss of hearing which may be directly attributable to the high noise level found in this occupation.

McCoy (32) reports on a study in which 100 preemployment audiometric tests were made on men going into noisy occupations at a large shipyard. These individuals gave no past history of exposure to noise, or disease of ear, nose, or throat. It was found that after working 7 hours at the task of chipping (110 to 130 decibels) a representative group of men had a distinct loss in hearing. This decrement was also discernible the following day. Further, McCoy reports, after a period of one month there was found to be a definite loss of hearing in the high frequencies which was not materially affected by a rest of one or two days. Examination of chippers after a year or more of exposure to this noise revealed a similar though more extensive loss.

In an earlier survey made by the Department of Labor in New York State (48) 1040 workers in several different noisy industries were tested audiometrically, and the highest incidence of deafness was found to be in those industries with the highest noise-level. In the group of workers exposed to the noise for less than a year it is reported in this study that only 6% appeared to have any hearing loss, while for those exposed to noise for 25 years or more, with no history of a possible causative disease, 26.9% were deaf in some form. It was inferred that these losses for the long tenure group were more than could be accounted for by the normal decrement with age. It was further reported that: "the greatest number of cases of deafening falls in the group between ages 21 and 30 years." Whether this age group tendency would hold true for workers in many other industries is difficult to predict.

*Physiology of Deafness.* Although extensively studied and much worthwhile information has been presented on it, the question of the exact organic effects of noise on the hearing mechanism is still not conclusively answered. This is chiefly due to a deficiency in our knowledge of the process of hearing. Good discussions of the hearing mechanism and various aspects of acoustic phenomena may be found in several sources, for example (8, 14, 33, 43).

There has been, however, confidence in the scientific foundation of deafness as is illustrated by Goldner's comment (18) that: "The etiology of industrial deafness is on a sound pathologic and physiologic basis. The most important findings are degenerative changes in the outer hair cells of the organ of Corti, starting in the basal whorl of the cochlea."

The studies reviewed by Kemp (24) on stimulation deafness lead him to comment summarily: "People who work in extremely noisy environments are often found to be hard of hearing, particularly for high frequencies."

Stevens (44) indicates that the explanation of selective hearing loss, *i.e.*, loss of acuity for specific frequency ranges instead of complete loss, can be made in terms of the construction of the hearing mechanism. He says: "High tones are localized near the basal end of the cochlea, 200 c.p.s. is at the middle and the lower octaves are closely bunched toward the helicotrema."

This arrangement, wherein the high pitches stimulate the basal (outermost) portion and the low pitches stimulate the apical (innermost) portion, makes it logical to conclude that the common and primary occurrence of high tone hearing loss is due to the vulnerability of the high tone receptors.

*Auditory Fatigue.* Probably every reader of this paper has experienced some degree of hearing loss of a temporary nature. Some decrease in auditory acuity is of such a brief duration that it may be more correctly called auditory fatigue than deafness. Rawdon-Smith (37) and Ewing and Littler (12) studied this fatigue of the hearing mechanism and point out, among other things, that the human threshold of fatigue is definitely lower in terms of intensity than is the threshold of feeling. This is of significance because while an individual does not think that a noise is loud enough to harm him it may unsuspectedly be diminishing his ability to hear. Fleming (13) emphasizes that "prolonged exposure to loud noise may cause permanent deafness . . . while less noise frequently causes temporary loss of hearing." Davis (10), after subjecting 19 men to high intensities of noise resembling airplane noise for several days, reported that "temporary impairment of hearing was regularly produced, but there was no evidence of cumulative injurious effects."

*Harmful Noise Levels.* Davis (8) says the answer is "yes" to the question, "Will the temporary hearing loss produced day after day and week after week ultimately become permanent?," if the noise is loud enough and if a loud exposure is repeated often enough. Davis adds, "We do not know how loud . . . is loud enough" to injure permanently. Hence, it is important to survey noisy industries and occupations to ascertain the levels which exist, so as to adequately protect the workers against ill effects. There seems to be great variability among individuals in their susceptibility to injury from noise as indicated in some reports (9, 18). However, in spite of this variable resistance it should be possible to grant a good margin of safety so that we can be confident that no workers will be affected adversely.

Various researchers have suggested different levels of noise above which there is danger. Schweisheimer (41) considers that the "hazard level" falls between 80 and 90 decibels. McCord and Goodell (29) have suggested that a level of "80 to 85 decibels will cause some defects of hearing in the high frequency zones after a period of years." McCord and Goodell (29), and McCoy (32) concur that levels over 100 decibels are a first concern. Davis (8) states that "noise of less than 100 decibels may reasonably be considered quite safe except perhaps for a few unusually susceptible individuals." Rosen-

blith (38) admits difficulty in specifying a danger level, but believes "as little as 75 or 85 decibels, if sufficiently prolonged, will suffice to bring about premature aging of the ear." Goldner (18) states that "A consensus seems to indicate that the minimum safe level is in the neighborhood of 80 decibels."

In the light of the preceding opinions expressed on noise intensities, based on experience and experimental evidence, it appears from the list of noise levels shown in Table I measured at a distance of three feet from the machines, that operators are subjected to literally deafening intensities.

TABLE I. NOISE LEVELS \* OF SEVERAL MACHINES (FROM SABINE AND WILSON, 39)

Machine	Decibels †
Punch presses, various types.....	96-103
Headers.....	101-105
Drop hammers.....	99-101
Bumping hammers.....	100
Hydraulic press.....	130
Automatic riveters.....	95-99
Lathes (average).....	80
Automatic screw machines.....	93-100
Airplane propeller grinding.....	100-105
Cotton spinning.....	84-87
Looms.....	94-101
Sewing machines.....	93-96
Wood planers.....	98-110
Wood saw.....	100
Wire rope, stranding machines.....	100-104
Ball mill.....	99

\* Information is not available on the frequency components of these noise levels.

† Measured at a distance of three feet from the machines. The opinion expressed that greatest functional utility of the noise-level measurements would accrue from placing the microphone of the noise-level instrument at the customary position of the ear of the worker engaged in operating the machine. (Dr. M. D. Steer, Voice Science Laboratory, Purdue University.)

Sabine and Wilson (39) report that: "Noise level measurements were made in 33 separate plants covering a wide diversity of industries and machine operations. Of all the readings taken in actual work areas, the highest was 130 db. and the lowest 65 db. In the majority of cases, the observed noise level ranged quite uniformly between approximately 85 and 105 db."

McCoy (32) stresses an important point when he suggests that the opinion of the worker may be unreliable in judging whether a noise is great enough to be harmful, because pain occurs at a higher level than that at which noise is actually harmful to hearing.

From the standpoint of expediency in initiating noise control in industry the advice of McCord and Goodell (29) merits consideration. They advise: "In estimating a hazardous noise level in industry one should, from a practical point of view, use a threshold which will not provide too unwieldy a

group requiring preventive treatment so that management will be more likely to take immediate steps."

**Compensation for Hearing Loss.** Gardner (16) has asked the question in connection with the hearing loss demonstrated in the audiogram of Figure 2: "What is to prevent them [these and similar workers with impaired hearing] from proving their claims in compensation cases?" Bunch (4) reporting on compensation for hearing disability in 1942 stated that:

"Cases of this kind do appear before courts, and compensation boards are making awards for hearing losses. The amount of the award often appears to depend not on the amount of damage to hearing but on the relative technical skills of the representatives of the interested parties. A glance through the decisions from different states shows a lack of uniformity. Only a few states have adopted definite schedules. Insurance companies have worked out no general schedule of awards for acquired hearing defects comparable with that used for acquired visual defects."

That attention is being paid to development of valid and scientific bases for evaluation of hearing loss is illustrated in a comprehensive review by Carter (5) covering eleven methods for determining and recording hearing loss. In 1938 the Consultants on Audiometers and Hearing Aids of the Council on Physical Medicine of the American Medical Association, realizing the lack of uniformity of methods for evaluating the percentage loss of hearing for speech, began formulation of a usable technique. Their work resulted in publication in 1947 of a Tentative Standard Procedure for Evaluating the Percentage Loss of Hearing in Medicolegal Cases (50).

Although this group has done commendable work in formulating this tentative schedule, one might make the criticism that it adjudges only "loss of hearing for speech." Admittedly loss for the hearing of speech is the important item, but it does seem that often compensation for loss in high and low frequencies should probably be granted if it is construed to be a disability, as it may very well be, e.g., the worker suffering high frequency loss (the most common type) is occasionally endangered and often inconvenienced by not being able to hear the shrill tones of some warning devices.

Dr. W. E. Grove (19), chairman of the sub-committee on noise of the Committee on Conservation of Hearing of the American Academy of Ophthalmology and Otolaryngology, has recently reported initiation of careful, exact, scientific examination of the hearing of employees in noisy industries. This work aims at actual "in plant" study, particularly, in an effort to discover characteristics of those employees whose hearing mechanism may be "noise-susceptible." The work of this group can be expected to throw new light on the noise problem in industry.

**Diagnosis of Occupational Deafness.** Goldner (18) indicates that the correct diagnosis of occupational deafness is especially important as cases are brought before compensation boards. He finds it worthwhile to describe under the heading of deafness due to noise and explosive sounds, two types

of deafness, *viz.*: (1) acute (easily observable and due to explosive noises of extreme intensity) and (2) chronic (of most importance to the medical profession, industry and labor . . . "deafness is insidious in onset and the intensity of the noise is below the level of painful stimulation"). Goldner states that the technique for diagnosis of the chronic type is:

" . . . based on a history of exposure to noise capable of producing injury to the organs of hearing; a normal ear drum; an elevated threshold for high tones, as manifested on the audiogram and with tuning fork or tests with Galton's whistle; diminished bone conduction, as shown by a positive Rinne and a positive Schwabach test; normal vestibular responses; patent eustachian tubes; differentiation from other lesions capable of producing a similar clinical picture."

Perlman (35) emphasizes the difficulty of determining cause and effect relationship with respect to auditory loss. He gives the following list of the relevant factors influencing the degree of the loss: (1) total time of exposure; (2) length of each exposure; (3) loudness of sound stimulus; (4) age of subject; (5) constitutional factors; (6) character of sound, constant or sharp; (7) use of protective devices; (8) exposure in closed or open spaces; (9) previous aural disease; and (10) frequency of stimulus.

"The problem of determining how much damage of the hearing is due to the accompanying pathologic process and how much is due to industrial noise is a difficult one; each case must be judged individually" (18).

**Eliminating or Controlling Noise in Industry.** Among the ways of eliminating or at least reducing noise in industry are: acoustical treatment, isolation of the source, reduction of vibration, maintenance and substitute methods, and equipment and plant design.

Lindahl (28) reports that acoustical treatment will yield only 6 to 10 decibel reduction, but he goes on to point out that this amount of change may result in a decrease in loudness, according to the average worker, of anywhere from 30 to 70 per cent which from an attitudinal standpoint, at least, is considerable. A thorough discussion of sound absorption is given by Sabine and Wilson (39). A report of an "in plant" experiment on advantages of acoustical treatment is given by Berrien and Young (3).

Isolation of noise sources has been the only solution to the noise problem in some plants such as those having engine test stands. Vibration reduction by use of cushioning, rubber and felt mountings for equipment, and even floor suspension has decreased the noise problem in many enterprises. It has been inferred (28) that when the designer tries to reduce vibration to preclude noise he finds very often that he has achieved efficiency.

Quite obvious is the effect of properly maintaining equipment in order to keep it free from rattles, squeaks, etc., which tend to wear both on the human and on the machine. Substitution of quiet operations such as welding for riveting may materially reduce noise levels in those operations where they are feasible.

Forethought given to machine and plant design may solve noise problems before they occur. Johnston (23) suggests that a 5 to 10 degree outward slant of walls deflects sound into sound absorbent materials attached to the ceiling, which should be as low as is practical in order to bring the absorbent material close to the noise source.

In addition to those already mentioned many valuable suggestions on ways to control noise in industry may be found in the published literature, some of which are the following: (1, 7, 13, 22, 28, 30, 39, 47, 49).

In the event of the impossibility of eliminating a noise hazard, as in the case of explosions in some occupations, the use of ear plugs or stoppers is an alternate procedure. McCoy (31) states that: "Workers should be safeguarded against the developing cushion of deafness and urged to wear ear protection for health." Other researchers (8, 11, 26, 45) have also recommended various types of ear defenders, from a wad of cotton to the V51-R "Ear Warden."

The "Ear Warden" ear plug was devised in the Psycho-Acoustic Laboratory at Harvard University under the auspices of the National Research Council. It is moulded of soft black neoprene, a synthetic rubber. It was found to be practical on the basis of ease of insertion, cleanliness, durability, low cost, feasibility of mass production, and comfort to the wearer. Extensive testing demonstrated the efficiency of the plug (45).

Goldner (18), however, points out a disadvantage of present ear protection when he says: "most workers are reluctant to submit to any effective dampening of normal hearing impulses," because of the obvious interference with detection of warning sounds, either vocal or from machines. He believes that possibly some sort of sound filter can be devised to filter out harmful sound intensities in high or low frequencies and still allow perception of speech.

Other objections (21) to ear plugs are that they cause pressure to build up in the ears and make the ears feel stuffy; they trap moisture in the ear and promote growth of fungi; and further, they may carry infectious material into the ear. The use of external coverings of the ear (ear-caps) has been suggested as a possible solution for exclusion of noise to the ear. They would avoid the difficulties mentioned for the ear-plugs and would be especially advantageous in that an easy check could be made on whether or not ear protection was actually being used.

In general, if ear protectors of any type are a real safeguard to the worker's welfare it would seem that management's insistence on employees wearing them is as justified as regulations concerning the use of safety eye-wear to prevent damage to the eyes.

#### SUMMARY

From the standpoint of both management and labor there are many advantages to be gained from control of noise within industry. Complete con-

demnation of noise in industry may be unwarranted in view of the possible exhilarating influences of some sounds; also, some experimentation (42) suggests that the harmful effect of noise has been overemphasized. However, the greater quantity of the experimental evidence indicates that there are many circumstances wherein noise is deleterious. Especially significant are the deafening effects on the worker in noisy industries. The authors of this article agree with Gruss (20) who concludes, "The great and overwhelming weight of authority is that: (1) hearing is impaired by industrial noise; (2) groups subjected to the loudest noises are most affected. . . ."

The immediate action on the part of the employer who may be confronted by the noise problem would appear to be:

1. Noise measurement, in terms of intensity levels and composition;
2. Institution of feasible noise elimination or reduction measures;
3. Establishment of some form of hearing testing program for workers engaged in noisy occupations, the first step of which would be preemployment audiometric testing of those employees who are to work in "harmful" noise levels.

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## 6. The Western Electric Researches

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Reprinted by permission of the author and the publisher from Chapter 4, "The Western Electric Researches," in *Fatigue of Workers: Its Relation to Industrial Production* (New York: Reinhold Publishing Corp., 1941). This condensed account of the famous research studies carried on at the Hawthorne Works of the Western Electric Company shows the enormous complexity of the problem of production in its relation to efficiency. The studies clearly demonstrate the necessity for considering worker attitude in any attempt to obtain a total picture of the factors affecting efficiency within an industrial organization.

In April, 1927, six girls were selected from a large shop department of the Hawthorne Works. They were chosen as average workers, neither inexperienced nor expert, and their work consisted of the assembling of telephone relays. A coil, armature, contact springs, and insulators were put together on a fixture and secured in position by means of four machine screws. The operation at that time was being completed at the rate of about five relays in six minutes. This particular operation was chosen for the experiment because

the relays were being assembled often enough so that even slight changes in output rate would show themselves at once on the output record. Five of the girls were to do the actual assembly work; the duty of the sixth was to keep the others supplied with parts.

The test room itself was an area divided from the main department by a wooden partition eight feet high. The girls sat in a row on one side of a long workbench. The bench and assembly equipment were identical with those used in the regular department, except in one respect. At the right of each girl's place was a hole in the bench, and into this hole she dropped completed relays. It was the entrance to a chute, in which there was a flapper gate opened by the relay in its passage downward. The opening of the gate closed an electrical circuit which controlled a perforating device, and this in turn recorded the completion of the relay by punching a hole in a tape. The tape moved at the rate of one-quarter of an inch a minute and had space for a separate row of holes for each operator. When punched, it thus constituted a complete output record for each girl for each instant of the day. Such records were kept for five years.

In this experiment, then, as in the earlier illumination experiments, great emphasis was laid on the rate of output. A word of caution is needed here. The Western Electric Company was not immediately interested in increasing output. The experiments were not designed for that purpose. On the other hand, output is easily measured, *i.e.*, it yields precise quantitative data, and experience suggested that it was sensitive to at least some of the conditions under which the employees worked. Output was treated as an index. In short, the nature of the experimental conditions made the emphasis on output inevitable.

From their experience in the illumination experiments, the investigators were well aware that factors other than those experimentally varied might affect the output rate. Therefore arrangements were made that a number of other records should be kept. Unsuitable parts supplied by the firm were noted down, as were assemblies rejected for any reason upon inspection. In this way the type of defect could be known and related to the time of day at which it occurred. Records were kept of weather conditions in general and of temperature and humidity in the test room. Every six weeks each operator was given a medical examination by the company doctor. Every day she was asked to tell how many hours she had spent in bed the night before and, during a part of the experiment, what food she had eaten. Besides all these records, which concerned the physical condition of the operators, a log was kept in which were recorded the principal events in the test room hour by hour, including among the entries snatches of conversation between the workers. At first these entries related largely to the physical condition of the operators: how they felt as they worked. Later the ground they covered somewhat widened, and the log ultimately became one of the most important

of the test room records. Finally, when the so-called Interviewing Program was instituted at Hawthorne, each of the operators was interviewed several times by an experienced interviewer.

The girls had no supervisor in the ordinary sense, such as they would have had in a regular shop department, but a "test room observer" was placed in the room, whose duty it was to maintain the records, arrange the work, and secure a cooperative spirit on the part of the girls. Later, when the complexity of his work increased, several assistants were assigned to help him.

When the arrangements had been made for the test room, the operators who had been chosen to take part were called in for an interview in the office of the superintendent of the Inspection Branch, who was in general charge of the experiment and of the researches which grew out of it. The superintendent described this interview as follows: "The nature of the test was carefully explained to these girls and they readily consented to take part in it, although they were very shy at the first conference. An invitation to six shop girls to come up to a superintendent's office was naturally rather startling. They were assured that the object of the test was to determine the effect of certain changes in working conditions, such as rest periods, midmorning lunches, and shorter working hours. They were expressly cautioned to work at a comfortable pace, and under no circumstances to try and make a race out of the test." This conference was only the first of many. Whenever any experimental change was planned, the girls were called in, the purpose of the change was explained to them, and their comments were requested. Certain suggested changes which did not meet with their approval were abandoned. They were repeatedly asked, as they were asked in the first interview, not to strain but to work "as they felt."

The experiment was now ready to begin. Put in its simplest terms, the idea of those directing the experiment was that if an output curve was studied for a long enough time under various changes in working conditions, it would be possible to determine which conditions were the most satisfactory. Accordingly, a number of so-called "experimental periods" were arranged. For two weeks before the operators were placed in the test room, a record was kept of the production of each one without her knowledge. In this way the investigators secured a measure of her productive ability while working in the regular department under the usual conditions. This constituted the first experimental period. And for five weeks after the girls entered the test room no change was made in working conditions. Hours remained what they had been before. The investigators felt that this period would be long enough to reveal any changes in output incidental merely to the transfer. This constituted the second experimental period.

The third period involved a change in the method of payment. In the regular department, the girls had been paid according to a scheme of group piece-work, the group consisting of a hundred or more employees. Under these cir-

cumstances, variations in an individual's total output would not be immediately reflected in her pay, since such variations tended to cancel one another in such a large group. In the test room, the six operators were made a group by themselves. In this way each girl received an amount more nearly in proportion to her individual effort, and her interests became more closely centered on the experiment. Eight weeks later, the directly experimental changes began. An outline will reveal their general character: Period IV: two rest pauses, each five minutes in length, were established, one occurring in mid-morning and the other in the early afternoon. Period V: these rest pauses were lengthened to ten minutes each. Period VI: six five-minute rests were established. Period VII: the company provided each member of the group with a light lunch in the midmorning and another in the midafternoon, accompanied by rest pauses. This arrangement became standard for subsequent Periods VIII through XI. Period VIII: work stopped a half-hour earlier every day—at 4:30 p.m. Period IX: work stopped at 4 p.m. Period X: conditions returned to what they were in Period VII. Period XI: a five-day work week was established. Each of these experimental periods lasted several weeks.

Period XI ran through the summer of 1928, a year after the beginning of the experiment. Already the results were not what had been expected. The output curve, which had risen on the whole slowly and steadily throughout the year, was obviously reflecting something other than the responses of the group to the imposed experimental conditions. Even when the total weekly output had fallen off, as it could hardly fail to do in such a period as Period XI, when the group was working only five days a week, daily output continued to rise. Therefore, in accordance with a sound experimental procedure, it was agreed with the consent of the operators that in experimental Period XII a return should be made to the original conditions of work, with no rest pauses, no special lunches, and a full-length working week. This period lasted for twelve weeks. Both daily and weekly output rose to a higher point than ever before: the working day and the working week were both longer. The hourly output rate declined somewhat but it did not approach the level of Period III, when similar conditions were in effect.

The conclusions reached after Period XII may be expressed in terms of another observation. Identical conditions of work were repeated in three different experimental periods: Periods VII, X, and XIII. If the assumptions on which the study was based had been correct, that is to say, if the output rate were directly related to the physical conditions of work, the expectation would be that in these three experimental periods there would be some similarity in output. Such was not the case. The only apparent uniformity was that in each experimental period output was higher than in the preceding one. In the Relay Assembly Test Room, as in the previous illumination experiments, something was happening which could not be explained by the experimentally controlled conditions of work.

The question remains:

With what facts, if any, can the changes in the output rate of the operators in the test room be correlated? Here the statements of the girls themselves are of the first importance. Each girl knew that she was producing more in the test room than she ever had in the regular department, and each said that the increase had come about without any conscious effort on her part. It seemed easier to produce at the faster rate in the test room than at the slower rate in the regular department. When questioned further, each girl stated her reasons in slightly different words, but there was uniformity in the answers in two respects. First, the girls liked to work in the test room; "it was fun." Secondly, the new supervisory relation or, as they put it, the absence of the old supervisory control, made it possible for them to work freely without anxiety.

For instance, there was the matter of conversation. In the regular department, conversation was in principle not allowed. In practice it was tolerated if it was carried on in a low tone and did not interfere with work. In the test room an effort was made in the beginning to discourage conversation, though it was soon abandoned. The observer in charge of the experiment was afraid of losing the cooperation of the girls if he insisted too strongly on this point. Talk became common and was often loud and general. Indeed, the conversation of the operators came to occupy an important place in the log. T. N. Whitehead has pointed out that the girls in the test room were far more thoroughly supervised than they ever had been in the regular department. They were watched by an observer of their own, an interested management, and outside experts. The point is that the character and purpose of the supervision were different and were felt to be so.

The operators knew that they were taking part in what was considered an important and interesting experiment. They knew that their work was expected to produce results—they were not sure what results—which would lead to the improvement of the working conditions of their fellow employees. They knew that the eyes of the company were upon them. Whitehead has further pointed out that although the experimental changes might turn out to have no physical significance, their social significance was always favorable. They showed that the management of the company was still interested, that the girls were still part of a valuable piece of research. In the regular department, the girls, like the other employees, were in the position of responding to changes the source and purpose of which were beyond their knowledge. In the test room, they had frequent interviews with the superintendent, a high officer of the company. The reasons for the contemplated experimental changes were explained to them. Their views were consulted and in some instances they were allowed to veto what had been proposed. Professor Mayo has argued that it is idle to speak of an experimental period like Period XII as being in any sense what it purported to be—a return to

the original conditions of work. In the meantime, the entire industrial situation of the girls had been reconstructed.

Another factor in what occurred can only be spoken of as the social development of the group itself. When the girls went for the first time to be given a physical examination by the company doctor, someone suggested as a joke that ice cream and cake ought to be served. The company provided them at the next examination, and the custom was kept up for the duration of the experiment. When one of the girls had a birthday, each of the others would bring her a present, and she would respond by offering the group a box of chocolates. Often one of the girls would have some good reason for feeling tired. Then the others would "carry" her. That is, they would agree to work especially fast to make up for the low output expected from her. It is doubtful whether this "carrying" did have any effect, but the important point is the existence of the practice, not its effectiveness. The girls made friends in the test room and went together socially after hours. One of the interesting facts which has appeared from Whitehead's analysis of the output records is that there were times when variations in the output rates of two friends were correlated to a high degree. Their rates varied simultaneously and in the same direction—something, of course, which the girls were not aware of and could not have planned. Also, these correlations were destroyed by such apparently trivial events as a change in the order in which the girls sat at the workbench.

Finally, the group developed leadership and a common purpose. The leader, self-appointed, was an ambitious young Italian girl who entered the test room as a replacement after two of the original members had left. She saw in the experiment a chance for personal distinction and advancement. The common purpose was an increase in the output rate. The girls had been told in the beginning and repeatedly thereafter that they were to work without straining, without trying to make a race of the test, and all the evidence shows that they kept this rule. In fact, they felt that they were working under less pressure than in the regular department. Nevertheless, they knew that the output record was considered the most important of the records of the experiment and was always closely scrutinized. Before long they had committed themselves to a continuous increase in production. In the long run, of course, this ideal was an impossible one, and when the girls found out that it was, the realization was an important element of the change of tone which was noticeable in the second half of the experiment. But for a time they felt that they could achieve the impossible. In brief, the increase in the output rate of the girls in the Relay Assembly Test Room could not be related to any changes in their physical conditions of work, whether experimentally induced or not. It could, however, be related to what can only be spoken of as the development of an organized social group in a peculiar and effective relation with its supervisors.

Many of these conclusions were not worked out in detail until long after the investigators at Hawthorne had lost interest in the Relay Assembly Test Room, but the general meaning of the experiment was clear at least as early as Period XII. A continuous increase in productivity had taken place irrespective of changing physical conditions of work. In the words of a company report made in January 1931 on all the research which had been done up to that date: "Upon analysis, only one thing seemed to show a continuous relationship with this improved output. This was the mental attitude of the operators. From their conversations with each other and their comments to the test observers, it was not only clear that their attitudes were improving but it was evident that this area of employee reactions and feelings was a fruitful field for industrial research."

At this point the attention of the investigators turned sharply from the test room to the regular shop department from which the girls had come. Why was the mental attitude of the girls different in the test room from what it had been in the department? In their conversations with one another and in their comments to the observers, the girls were full of comparisons between the test room and the department, very much to the disadvantage of the latter. They felt relief from some form of constraint, particularly the constraint of supervision. They were exceedingly disparaging about the supervisors in the department, although management felt that the department had particularly good supervisory personnel. These facts suggested that the management of the company really knew very little about the attitudes which employees took toward conditions in the plant and very little also about what constituted good supervisory methods. Such was the atmosphere in which the so-called Interviewing Program, the third phase of the work at Hawthorne, was planned. So far the interests of the investigators had been centered on the question of what were good physical conditions of work. Now they shifted definitely in the direction of a study of human relations.

Finally, the investigators discovered, in the course of the regular interviews, evidence here and there in the plant of a type of behavior which strongly suggested that the workers were banding together informally in order to protect themselves against practices which they interpreted as a menace to their welfare. This type of behavior manifested itself in (a) "straight-line" output, that is, the operators had adopted a standard of what they felt to be a proper day's work and none of them exceeded it by very much; (b) a resentment of the wage incentive system under which they worked—in most cases, some form of group piecework; (c) expressions which implied that group piecework as a wage incentive plan was not working satisfactorily; (d) informal practices by which persons who exceeded the accepted standard, that is, "rate killers," could be punished and "brought into line"; (e) informal leadership on the part of individuals who undertook to keep the working group together and enforce its rules; (f) feelings of futility with regard to

promotions; and (g) extreme likes and dislikes toward immediate superiors, according to their attitude toward the behavior of the operators. The investigators felt that this complex of behavior deserved further study.

In view of these considerations, the decision was taken in May, 1931, to assign selected interviewers to particular groups of employees and allow them to interview the employees as often as they felt was necessary. The story of one of these groups is characteristic of the findings reached by this new form of interviewing. The work of the employees was the adjustment of small parts which went into the construction of telephone equipment. The management thought that the adjustment was a complicated piece of work. The interviewer found that it was really quite simple. He felt that anyone could learn it, but that the operators had conspired to put a fence around the job. They took pride in telling how apparatus which no one could make work properly was sent in from the field for adjustment. Then telephone engineers would come in to find out from the operators how the repairs were made. The latter would fool around, doing all sorts of wrong things and taking about two hours to adjust the apparatus, and in this way prevented people on the outside from finding out what they really did. They delighted in telling the interviewer how they were pulling the wool over everybody's eyes. It followed that they were keeping the management in ignorance as to the amount of work they could do. The output of the group, when plotted, was practically a straight line.

Obviously this result could not have been gained without some informal organization, and such organization in fact there was. The group had developed leadership. Whenever an outsider—engineer, inspector, or supervisor—came into the room, one man always dealt with him. Whenever any technical question was raised about the work, this employee answered it. For other purposes, the group had developed a second leader. Whenever a new man came into the group, or a member of the group boosted output beyond what was considered the proper level, this second leader took charge of the situation. The group had, so to speak, one leader for dealing with foreign and one for dealing with domestic affairs. The different supervisors were largely aware of the situation which had developed, but they did not try to do anything about it because in fact they were powerless. Whenever necessary, they themselves dealt with the recognized leaders of the group.

Finally, the investigator found that the group was by no means happy about what it was doing. Its members felt a vague dissatisfaction or unrest, which showed itself in a demand for advancements and transfers or in complaints about their hard luck in being kept on the job. This experience of personal futility could be explained as the result of divided loyalties—divided between the group and the company.

In order to study this kind of problem further, to make a more detailed investigation of social relations in a working group, and to supplement inter-

view material with direct observation of the behavior of employees, the Division of Industrial Research decided to set up a new test room. But the investigators remembered what happened in the former test room and tried to devise an experiment which would not be radically altered by the process of experimentation itself. They chose a group of men—nine wiremen, three soldermen, and two inspectors—engaged in the assembly of terminal banks for use in telephone exchanges, took them out of their regular department and placed them in a special room. Otherwise no change was made in their conditions of work, except that an investigator was installed in the room, whose duty was simply to observe the behavior of the men. In the Relay Assembly Test Room a log had been kept of the principal events of the test. At the beginning it consisted largely of comments made by the workers in answer to questions about their physical condition. Later it came to include a much wider range of entries, which were found to be extremely useful in interpreting the changes in the output rate of the different workers. The work of the observer in the new test room was in effect an expansion of the work of keeping the log in the old one. Finally, an interviewer was assigned to the test room; he was not, however, one of the population of the room but remained outside and interviewed the employees from time to time in the usual manner. No effort was made to get output records other than the ones ordinarily kept in the department from which the group came, since the investigators felt that such a procedure would introduce too large a change from a regular shop situation. In this way the experiment was set up which is referred to as the Bank Wiring Observation Room. It was in existence seven months, from November 1931 to May 1932.

The method of payment is the first aspect of this group which must be described. It was a complicated form of group piecework. The department of which the workers in the observation room were a part was credited with a fixed sum for every unit of equipment it assembled. The amount thus earned on paper by the department every week made up the sum out of which the wages of all the men in the department were paid. Each individual was then assigned an hourly rate of pay, and he was guaranteed this amount in case he did not make at least as much on a piecework basis. The rate was based on a number of factors, including the nature of the job a worker was doing, his efficiency, and his length of service with the company. Records of the output of every worker were kept, and every six months there was a rate revision, the purpose of which was to make the hourly rates of the different workers correspond to their relative efficiency.

The hourly rate of a given employee, multiplied by the number of hours worked by him during the week, was spoken of as the daywork value of the work done by the employee. The daywork values of the work done by all the employees in the department were then added together, and the total thus obtained was subtracted from the total earnings credited to the department

for the number of units of equipment assembled. The surplus, divided by the total daywork value, was expressed as a percentage. Each individual's hourly rate was then increased by this percentage, and the resulting hourly earnings figure, multiplied by the number of hours worked, constituted that person's weekly earnings.

Another feature of the system should be mentioned here. Sometimes a stoppage which was beyond the control of the workers took place in the work. For such stoppages the workers were entitled to claim time out, being paid at their regular hourly rates for this time. This was called the "daywork allowance claim." The reason why the employees were paid their hourly rate for such time and not their average hourly wages was a simple one. The system was supposed to prevent stalling. The employees could earn more by working than they could by taking time out. As a matter of fact, there was no good definition of what constituted a stoppage which was beyond the control of the workers. All stoppages were more or less within their control. But this circumstance was supposed to make no difference in the working of the system, since the assumption was that in any case the workers, pursuing their economic interests, would be anxious to keep stoppages at a minimum.

This system of payment was a complicated one, but it is obvious that there was a good logical reason for every one of its features. An individual's earnings would be affected by changes in his rate or in his output and by changes in the output of the group as a whole. The only way in which the group as a whole could increase its earnings was by increasing its total output. It is obvious also that the experts who designed the system made certain implicit assumptions about the behavior of human beings, or at least the behavior of workers in a large American factory. They assumed that every employee would pursue his economic interest by trying to increase not only his own output but the output of every other person in the group. The group as a whole would act to prevent slacking by any of its members. One possibility, for instance, was that by a few weeks' hard work an employee could establish a high rate for himself. Then he could slack up and be paid out of all proportion with the amount he actually contributed to the wages of the group. Under these circumstances, the other employees were expected to bring pressure to bear to make him work harder.

Such was the way in which the wage incentive scheme ought to have worked. The next question is how it actually did work. At first the workers were naturally suspicious of the observer, but when they got used to him and found that nothing out of the ordinary happened as a result of his presence in the room, they came to take him for granted. The best evidence that the employees were not distrustful of the observer is that they were willing to talk freely to him about what they were doing, even when what they were doing was not strictly in accord with what the company expected. Conversation would die down when the group chief entered the room, and when the foreman or the

assistant foreman entered everyone became serious. But no embarrassment was felt at the presence of the observer. To avoid misunderstanding, it is important to point out that the observer was in no sense a spy. The employees were deliberately and obviously separated from their regular department. The observer did not, and could not, pass himself off as one of them. And if only from the fact that a special interviewer was assigned to them, the members of the group knew they were under investigation.

The findings reached by the observer were more detailed but in general character the same as those which had emerged from the early interviews of other groups. Among the employees in the observation room there was a notion of a proper day's work. They felt that if they had wired two equipments a day they had done about the right amount. Most of the work was done in the morning. As soon as the employees felt sure of being able to finish what they considered enough for the day, they slacked off. This slacking off was naturally more marked among the faster than among the slower workmen.

As a result, the output graph from week to week tended to be a straight line. The employees resorted to two further practices in order to make sure that it should remain so. They reported more or less output than they performed and they claimed more daywork allowances than they were entitled to. At the end of the day, the observer would make an actual count of the number of connections wired—something which was not done by the supervisors—and he found that the men would report to the group chief sometimes more and sometimes less work than they actually had accomplished. At the end of the period of observation, two men had completed more than they ever had reported, but on the whole the error was in the opposite direction. The theory of the employees was that excess work produced on one day should be saved and applied to a deficiency on another day. The other way of keeping the output steady was to claim excessive daywork allowance. The employees saw that the more daywork they were allowed, the less output they would have to maintain in order to keep the average hourly output rate steady. The claims for daywork allowance were reported by the men to their group chief, and he, as will be seen, was in no position to make any check. These practices had two results. In the first place, the departmental efficiency records did not represent true efficiency, and therefore decisions as to grading were subject to errors of considerable importance. In the second place, the group chief was placed in a distinctly awkward position.

The findings of the observer were confirmed by tests which were made as a part of the investigation. Tests of intelligence, finger dexterity, and other skills were given to the workers in the room, and the results of the tests were studied in order to discover whether there was any correlation between output on the one hand and earnings, intelligence, or finger dexterity on the other. The studies showed that there was not. The output was apparently not reflecting the native intelligence or dexterity of the members of the group.

Obviously the wage incentive scheme was not working in the way it was expected to work. The next question is why it was not working. In this connection, the observer reported that the group had developed an informal social organization, such as had been revealed by earlier investigations. The foreman who selected the employees taking part in the Bank Wiring Observation Room was cooperative and had worked with the investigators before. They asked him to produce a normal group. The men he chose all came out of the same regular shop department, but they had not been closely associated in their work there. Nevertheless, as soon as they were thrown together in the observation room, friendships sprang up and soon two well-defined cliques were formed. The division into cliques showed itself in a number of ways: in mutual exclusiveness, in differences in the games played during off-hours, and so forth.

What is important here is not what divided the men in the observation room but what they had in common. They shared a common body of sentiments. A person should not turn out too much work. If he did, he was a "rate-buster." The theory was that if an excessive amount of work was turned out, the management would lower the piecework rate so that the employees would be in the position of doing more work for approximately the same pay. On the other hand, a person should not turn out too little work. If he did, he was a "chiseler"; that is, he was getting paid for work he did not do. A person should say nothing which would injure a fellow member of the group. If he did, he was a "squealer." Finally, no member of the group should act officiously.

The working group had also developed methods of enforcing respect for its attitudes. The experts who devised the wage incentive scheme assumed that the group would bring pressure to bear upon the slower workers to make them work faster and so increase the earnings of the group. In point of fact, something like the opposite occurred. The employees brought pressure to bear not upon the slower workers but upon the faster ones, the very ones who contributed most to the earnings of the group. The pressure was brought to bear in various ways. One of them was "binging." If one of the employees did something which was not considered quite proper, one of his fellow workers had the right to "bing" him. Binging consisted of hitting him a stiff blow on the upper arm. The person who was struck usually took the blow without protest and did not strike back. Obviously the virtue of binging as punishment did not lie in the physical hurt given to the worker but in the mental hurt that came from knowing that the group disapproved of what he had done. Other practices which naturally served the same end were sarcasm and the use of invectives. If a person turned out too much work, he was called names, such as "Speed King" or "The Slave."

It is worth while pointing out that the output of the group was not considered low. If it had been, some action might have been taken, but in point of

fact it was perfectly satisfactory to the management. It was simply not so high as it would have been if fatigue and skill had been the only limiting factors.

In the matter of wage incentives, the actual situation was quite different from the assumptions made by the experts. Other activities were out of line in the same way. The wiremen and the soldermen did not stick to their jobs; they frequently traded them. This was forbidden, on the theory that each employee ought to do his own work because he was more skilled in that work. There was also much informal helping of one man by others. In fact, the observation of this practice was one means of determining the cliques into which the group was divided. A great many things, in short, were going on in the observation room which ought not to have been going on. For this reason it was important that no one should "squeal" on the men.

A group chief was in immediate charge of the employees. He had to see that they were supplied with parts and that they conformed to the rules and standards of the work. He could reprimand them for misbehavior or poor performance. He transmitted orders to the men and brought their requests before the proper authorities. He was also responsible for reporting to the foreman all facts which ought to come to his attention. The behavior of the employees put him in an awkward position. He was perfectly well aware of the devices by which they maintained their production at a constant level. But he was able to do very little to bring about a change. For instance, there was the matter of claims for daywork allowance. Such claims were supposed to be based on stoppages beyond the control of the workers, but there was no good definition of what constituted such stoppages. The men had a number of possible excuses for claiming daywork allowance: defective materials, poor and slow work on the part of other employees, and so forth. If the group chief checked up on one type of claim, the workers could shift to another. In order to decide whether or not a particular claim was justified, he would have to stand over the group all day with a stop watch. He did not have time to do that, and in any case refusal to honor the employees' claims would imply doubt of their integrity and would arouse their hostility. The group chief was a representative of management and was supposed to look after its interests. He ought to have put a stop to these practices and reported them to the foreman. But if he did so, he would, to use the words of a short account of the observation room by Roethlisberger and Dickson, "lose sympathetic control of his men, and his duties as supervisor would become much more difficult."<sup>1</sup> He had to associate with the employees from day to day and from hour to hour. His task would become impossible if he had to fight a

<sup>1</sup> F. J. Roethlisberger and W. J. Dickson, "Management and the Worker," *Business Research Studies*, No. 9 (Cambridge: Harvard Business School, Division of Research, 1939). (All quotations relating to the Western Electric researches are from this study as well as from the book of the same title by the same authors.)

running fight with them. Placed in this situation, he chose to side with the men and report unchanged their claims for daywork. In fact there was very little else he could do, even if he wished. Moreover he was in a position to protect himself in case of trouble. The employees always had to give him a reason for any daywork claims they might make, and he entered the claims in a private record book. If anyone ever asked why so much daywork was being claimed, he could throw the blame wherever he wished. He could assert that materials had been defective or he could blame the inspectors, who were members of an outside organization. In still another respect, then, the Bank Wiring Observation Room group was not behaving as the logic of management assumed that it would behave.

Restriction of output is a common phenomenon of industrial plants. It is usually explained as a highly logical reaction of the workers. They have increased their output, whereupon their wage rates for piecework have been reduced. They are doing more work for the same pay. They restrict their output in order to avoid a repetition of this experience. Perhaps this explanation holds good in some cases, but the findings of the Bank Wiring Room suggest that it is too simple. The workers in the room were obsessed with the idea that they ought to hold their production level "even" from week to week, but they were vague as to what would happen if they did not. They said that "someone" would "get them." If they turned out an unusually high output one week, that record would be taken thereafter as an example of what they could do if they tried, and they would be "bawled out" if they did not keep up to it. As a matter of fact, none of the men in the room had ever experienced a reduction of wage rates. What is more, as Roethlisberger and Dickson point out, "changes in piece rates occur most frequently where there is a change in manufacturing process, and changes in manufacturing process are made by engineers whose chief function is to reduce unit cost wherever the saving will justify the change. In some instance, changes occur irrespective of direct labor cost. Moreover, reduction of output tends to increase unit costs and instead of warding off a change in the piece rate may actually induce one."

What happened in the observation room could not be described as a logical reaction of the employees to the experience of rate reduction. They had in fact had no such experience. On the other hand, the investigators found that it could be described as a conflict between the technical organization of the plant and its social organization. By technical organization the investigators meant the plan, written or unwritten, according to which the Hawthorne plant was supposed to operate, and the agencies which gave effect to that plan. The plan included explicit rules as to how the men were to be paid, how they were to do their work, what their relations with their supervisors ought to be. It included also implicit assumptions on which the rules were based, one of the assumptions being that men working in the plant would on the whole act so as to further their economic interests. It is worth

while pointing out that this assumption was in fact implicit, that the experts who devised the technical organization acted upon the assumption without ever stating it in so many words.

There existed also an actual social situation within the plant: groups of men, who were associated with one another, held common sentiments and had certain relations with other groups and other men. To some extent this social organization was identical with the technical plan and to some extent it was not. For instance, the employees were paid according to group payment plans, but the groups concerned did not behave as the planners expected them to behave.

The investigators considered the relations between the technical organization and the social. A certain type of behavior is expected of the higher levels of management. Their success is dependent on their being able to devise and institute rapid changes. Roethlisberger and Dickson describe what happens in the following terms: "Management is constantly making mechanical improvements and instituting changes designed to reduce costs or improve the quality of the product. It is constantly seeking new ways and new combinations for increasing efficiency, whether in designing a new machine, instituting a new method of control, or logically organizing itself in a new way." The assumption has often been made that these changes are designed to force the employee to do more work for less money. As a matter of fact, many of them have just the opposite purpose: to improve the conditions of work and enable the employee to earn higher wages. The important point here, however, is not the purpose of the changes but the way in which they are carried out and accepted.

Once the responsible officer has decided that a certain change ought to be made, he gives an order, and this order is transmitted "down the line," appropriate action being taken at every level. The question in which the investigators were interested was this: What happens when the order reaches the men who are actually doing the manual work? Roethlisberger and Dickson made the following observations: "The worker occupies a unique position in the social organization. He is at the bottom of a highly stratified organization. He is always in the position of having to accommodate himself to changes which he does not originate. Although he participates least in the technical organization, he bears the brunt of most of its activities." It is he, more than anyone, who is affected by the decisions of management, yet in the nature of things he is unable to share management's preoccupations, and management does little to convince him that what he considers important is being treated as important at the top—a fact which is not surprising, since there is no adequate way of transmitting to management an understanding of the considerations which seem important at the work level. There is something like a failure of communication in both directions—upward and downward.

The worker is not only "asked to accommodate himself to changes which he does not initiate, but also many of the changes deprive him of those very things which give meaning and significance to his work." The modern industrial worker is not the handcraftsman of the medieval guild. Nevertheless, the two have much in common. The industrial worker develops his own ways of doing his job, his own traditions of skill, his own satisfactions in living up to his standards. The spirit in which he adopts his own innovations is quite different from that in which he adopts those of management. Furthermore, he does not do his work as an isolated human being, but always as a member of a group, united either through actual cooperation on the job or through association in friendship. One of the most important general findings of the Western Electric researches is the fact that such groups are continually being formed among industrial workers, and that the groups develop codes and loyalties which govern the relations of the members to one another. Though these codes can be quickly destroyed, they are not formed in a moment. They are the product of continued, routine interaction between men. "Constant interference with such codes is bound to lead to feelings of frustration, to an irrational exasperation with technical change in any form, and ultimately to the formation of a type of employee organization such as we have described—a system of practices and beliefs in opposition to the technical organization."

The Bank Wiring Observation Room seemed to show that action taken in accordance with the technical organization tended to break up, through continual change, the routines and human associations which gave work its value. The behavior of the employees could be described as an effort to protect themselves against such changes, to give management the least possible opportunity of interfering with them. When they said that if they increased their output, "something" was likely to happen, a process of this sort was going on in their minds. But the process was not a conscious one. It is important to point out that the protective function of informal organization was not a product of deliberate planning. It was more in the nature of an automatic response. The curious thing is that, as Professor Mayo pointed out to the Committee, these informal organizations much resembled formally organized labor unions, although the employees would not have recognized the fact.

Roethlisberger and Dickson summarize as follows the results of the intensive study of small groups of employees: "According to our analysis the uniformity of behavior manifested by these groups was the outcome of a disparity in the rates of change possible in the technical organization, on the one hand, and in the social organization, on the other. The social sentiments and customs of work of the employees were unable to accommodate themselves to the rapid technical innovations introduced. The result was to incite a blind resistance to all innovations and to provoke the formation of a social organization at a lower level in opposition to the technical organization."

## Part Eight: MARKET RESEARCH

### 1. Problems of Sampling in Market Research

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*Frank Stanton*

Reprinted from the *Journal of Consulting Psychology*, 1941, 5, 154-163, by permission of the author and the American Psychological Association, Inc. This paper is concerned with the problems of representativeness and size of samples in market research. It is pointed out that adequate representation can be best assured through the method of stratified or controlled sampling. Proper size can be determined in relation to the required precision of the answers by the application of the conventional standard error formula.

In the early thirties when market research was first becoming popular with advertisers and advertising agencies, one commercial research specialist, when approached by a prospective client with an inquiry as to the size of the sample necessary for a specific study, would reply invariably, "How much money do you have to spend?" and the sample was prescribed according to the answer!

That was some years ago. There are some in the field who still operate on such terms but, for the most part, market research technicians have profited by past experience. Today, while sampling is still one of the major problems in research, we are much more skilled in dealing with it (13, 9, 15).

**Sampling Problems.** Two important questions face every worker in this field: Is the sample representative? and, Is the sample large enough? To answer these two questions satisfactorily requires previous knowledge of the universe under study (item one: representativeness) and the application of statistics (item two: size). Far too few of today's market research studies meet even the minimum standards of representativeness and size. In fact most studies make little or no mention of self-imposed checks on the representativeness of the sample. Neither do they indicate, even with the cruder statistical measurements at their disposal, anything regarding the sample's adequacy in terms of size.

There are several probable reasons for this apparent laxness with regard to sampling problems. In the first place, as in other fields of research, good work costs money. And business today has not yet been educated to discriminate between good and bad market research; nor has it, therefore, come to

appreciate costs. But to insure effective sampling requires time and facilities. In many cases where insufficient time is allowed for careful sampling, it is not necessarily a matter of costs but stems usually from the very nature of the situation involved. For example, a new product is launched and an immediate check is required to determine the advertising's effectiveness. In such a problem the effects are not static; they must be ascertained immediately, in many cases without benefit of experimentation and "pretesting."

Another probable reason for present-day sampling weaknesses is the complete lack of understanding or interest on the part of most business executives for the problems involved. Without a knowledge of the theory of sampling and the consequent "sampling fluctuations," they cannot be expected to appreciate the fine points of sampling and are, therefore, unwilling to wait and pay for adequate checks. There are exceptions, of course, to this charge. The *Literary Digest* fiasco opened the eyes of many. Similar dramatic reversals within specific industries have either forced research out entirely or improved it. The difficulty is that in many instances there are insufficient methods of validation and, therefore, little opportunity to check results except by statistical devices and "post interview" controls of the sample, neither of which is entirely foolproof. Market research has few natural opportunities to validate the accuracy of its findings. Unlike public opinion research it does not have the benefit of national or state and local elections for checking its workmanship.

Probably the basic reason for the lack of sampling safeguards lies within the research personnel itself. A large number of independent research organizations are operated by business men and not by research men. In other words, the men at the top are not trained research-wise. Neither through professional schooling nor experience have they mastered the techniques of sampling and all it implies. This indictment should disappear as fast as universities take over the field on an effectual basis. Also it will tend to correct itself as research is taken more seriously by business. Once it gets beyond the sales promotion and advertising phase and is used intensively by and for management, the incompetent technicians will be thinned out and a new generation will emerge.

Generally speaking, in terms of use, there are three types of sampling techniques: accidental, random and stratified or controlled. In discussing the representativeness of a sample, each of these three conditions will be reviewed briefly.

The usual market research study can be classified in the group depending upon accidental sampling procedures. For sales purposes, research organizations usually describe the sampling as random, but, as we shall see later, the usual consumer survey violates the definition of random sampling at every turn of the way. Among the excuses cited by the practitioners of this accidental method would probably be the factors of cost and ease. While the accidental "plan" of sampling has nothing whatever to recommend it as far as

methodology goes, it should be noted here that there are wide variations in its application. In some studies, accidental sampling may mean interviewing anybody; in others, investigators may attempt to institute some controls by trying to interview what they consider a "cross section."

**Sampling Procedures.** In the usual market research study, insofar as sampling is concerned, three steps are involved. First, the market or markets to be studied are selected. Second, the universe within these markets is determined according to the subject of the study. If the problem concerns automobile tires, then the universe is confined to car owners. On the other hand, if the study involved the used of cosmetics, the interviewing would have been confined to women. The third step in the accidental plan is to turn the interviewers loose with the questions and allow them to query any member of the universe with little or no instructions.

Obviously there are many objections to such a procedure. Without a plan for interviewing, based either on a "random list" or quota controls by "stratified groups" (both to be discussed later), the sampling left entirely to the investigator will be biased. It thus happens that the investigator who follows this method of sampling is frequently misled as to the nature of the sample. The effort of the investigator to exercise no control over the selection of the sample does not mean that no control was operative.

The tendency on the part of interviewers to contact only certain restricted areas or groups within the total statistical population results in a rather carefully selected sample. The term "accidental" thus becomes a misnomer because clear-cut influences are at work. These factors are such that an experienced research worker can predict the nature of the sample selected in this way with amazing accuracy. Usually what happens is that the interviewer works in his or her own age, sex, income group or section of the market. Under such conditions the reports will not represent all social groups unless the investigators themselves are selected from all strata.

**Accidental Sampling.** In the accidental "plan," most of the interviewing is done where it is easiest and that usually is in the middle socio-economic range of society. Insufficient attention is given to the poor and relief families, Negro and foreign born and also, although not to the same extent, high income groups are excluded. If the problem under study is related to social or economic factors, results based on such sampling are ineffective—or what is even worse, misleading.

It is difficult to estimate what share of today's market research is conducted along this line. In the early days, it represented most of what was done but since the studies then were confined to relatively few markets, there was superior supervision and hence probably better work. With the "advance" in market research, studies have spread geographically until today most organizations maintain field workers on a loosely organized nationwide basis. Because of this spread, there is less control and supervision; most of it is by mail in place of the personal and direct contact of old.

It should be pointed out that the applications of the accidental method have not been confined wholly to market research. Most sampling for research conducted by investigators associated with schools and colleges is carried out along accidental lines. (And since the ordinary student body is further from the mean of the total population on most factors, the results obtained are usually atypical of anything save the sample examined.) Here the problem results probably from lack of opportunity to extend the sample. The serious thing, however, is that uncritical writers accept the findings of such studies without qualification as to the universe observed. There is ample justification for the contention that the chief contribution of the research done in colleges and universities to the field of market research has been a demonstration of the futility of attempting to generalize regarding the total population from data which have been collected in experiments using only college students as "subjects."

**Random Sampling.** In the application of the true random procedure, it is assumed that the universe to be studied is listed or catalogued. In such instances, if a 10 per cent sample is to be taken, the randomness of the sample is achieved by interviewing every tenth name in the catalogue. This should yield a virtually random sample provided the names have not been arranged according to any classification except an alphabetical one.

Surveys dependent on unlisted universes cannot follow this plan of operation. Or for that matter, it is impracticable, even where catalogues exist, for personal interviews because it involves wide travel to locate individual cases. Where it is used at all in every day market research, it is usually confined to telephone or mail studies, and only then if the universe is completely listed or catalogued.

One application of the random technique is the radio program measurement plan known as the "coincidental telephone" method. Here the universe is composed of radio-telephone homes in selected cities. (This plan is the basis for the program rating service maintained by C. E. Hooper, Inc.) In the telephone "coincidental interview," information is obtained regarding radio-set use at the time of the call. The operator notes whether the set is reported in use and, if in use, to which station and (or) program the set is tuned. Additional data are obtained in special cases on audience composition by age and sex and data on "sponsor identification" of the program being received. So much for completed calls. Records are also kept of all other initiated calls according to "non-answer," "refused," "busy," "sets not in use," etc.

The sample is drawn by selecting every *n*th resident telephone family listed in the telephone directories for the cities studied. In this way, it is assumed that the random selection insures a representative sample of telephone-radio homes. Insofar as conclusions regarding listening are not projected beyond the universe sampled, this procedure is satisfactory.

One can readily guess what usually happens to data collected under such conditions: projections are made to larger (e.g., non-telephone) universes without adequate evidence that the telephone-radio homes surveyed are representative of all radio families. It is reasonable to assume, however, that such is not the case for all programs because the appeal of the program, the hour of the broadcast and cities surveyed all may influence the audience in non-telephone homes differently from the listeners in telephone homes.

*Program Appeal.* For the most part, telephone ownership is confined to upper income groups (29,300,000 radio families; 12,500,000 telephone families). A program which appeals more to one-half of the income scale than the other would be incorrectly estimated if projections were made. Below are examples of actual radio program ratings in telephone and non-telephone homes. (The radio families in each group equals 100 per cent.)

	Telephone	Non-telephone
“Johnny Presents”.....	20.6%	26.1%
“Second Husband”.....	8.6	15.6
“Tune Up Time”.....	14.5	12.8

*Hour of Broadcast.* Again, because the telephone ownership correlates positively with income and because the periods of listening will vary income group by income group—due to working and living habits—this factor, too, operates to make projections unsafe from telephone homes to the total radio audience.

*Cities Surveyed.* The markets surveyed are selected because they all receive program service from three or more networks and have a sufficient number of telephone families. Therefore, projections to other geographic areas are unsound due to differences in program service (signal dissipation) and variations in program appeal by different population groups. Below are the same programs listed above rated by “city-size groups.” (Total radio families in each group equals 100 per cent.)

	Cities over 100,000	Cities under 100,000	Rural
“Johnny Presents”.....	22.4%	26.5%	25.3%
“Second Husband”.....	10.9	10.7	9.8
“Tune Up Time”.....	13.9	11.7	8.0

Insofar as the telephone coincidental technique employs the random sampling procedure correctly, it yields an unbiased sample. But data derived from a radio-telephone universe may not be projected to a larger universe unless it can be demonstrated that the smaller universe has listening habits identical with the larger one, *i.e.*, the smaller population (radio-telephone families) is representative of the larger population (all radio families).

In connection with this discussion of random sampling, it should be pointed out—in contradistinction to some other writers—that a random sample is not necessarily representative. Results based on random samples tend to distribute themselves about the true measure in a normal distribution. As in any normal distribution, therefore, one should expect deviate cases. Just as in a game of poker, where random sampling is practiced, there are cases where one hand is composed of a "royal flush." Such a hand is random but not representative. It is the infrequent deviate case.

Mail studies are usually resorted to in the interests of cost or ease of administration. But unless the replies approach 100 per cent of the original random mailing, the results may not be considered representative. Sometimes it is necessary to use a mail questionnaire in market research to reach special groups scattered throughout the total population. For instance, in querying school teachers regarding classroom use of radio, a random mailing is more efficient than personal interviews provided a complete list of teachers is available. It is only safe from a sampling point of view, however, when an effort is made to hear from all persons "sampled." Or, putting it another way, it is unsafe to project to the total universe because there is little likelihood that those who reply are representative of those who do not reply.

In a mail study of classroom use of radio, an analysis was made of the percentage of radio ownership among respondents to the original mailing of the questionnaire and those who were sent a special follow-up form (12). The figures below show clearly how dangerous it is to project from the usual mail return.

	Original Mailing	Follow-up Mailing
Teachers with classroom radios.....	33.0%	23.8%
Total teachers heard from (100 per cent)....	1,402	1,080

In this study there was a third group composed of those teachers who did not answer either mailing. While it was unsafe to project to the total sample, it was not unreasonable to assume that teachers from whom no response was received owned even fewer radios than the ones who replied.

In reality, while random sampling meets the theoretical standards of representative sampling, it is very difficult to apply the principles of the random method because seldom is the universe to be sampled catalogued, or when it is, the actual interviewing is impracticable on a face-to-face basis because of the travel involved. And if mail is used, it is unsafe unless all cases are heard from. The telephone coincidental interview used in rating radio programs in restricted areas is one of the few practical applications of the method.

**Controlled Sampling.** The "controlled" or "stratified" sampling procedure represents the most desirable plan for insuring representativeness. In this method, the interviews are allocated by strata according to the proportion each stratum represents in relation to the total universe. If the problem under study is related to income—and if 10 per cent of the universe is in the top income group, 25 per cent in the upper middle group, 30 per cent in the lower middle and 35 per cent in the lower group—then the sample would be "controlled" or "stratified" to the same proportions. Of course, it does no good to stratify the sample to insure representativeness unless one knows by prior test that the variable under study is related to the particular plan of stratification involved. For example, if one were studying preferences for radio program types, he might want to "control" or "stratify" the sample by age or economic levels. That is because we know program types vary by age and economic status. On the other hand, no effort would be made to stratify the sample by height or weight groups because such factors probably bear no constant relationship to program types.

It is very dangerous to omit the control on certain variables when there is the slightest suspicion that they are related in any way to the problem under investigation. Marital status, for example, might, on the surface, appear to be unrelated to a certain market problem. It might be argued, however, that marital status is an important determiner of buying, listening, or reading habits. In any event, the researcher would do well to control on this variable in selecting his sample. Of course, this principle can be carried to the point of impracticability, but an acknowledgment of its validity is a step in the right direction.

Under certain circumstances, the allocation of interviews or sampling is controlled by more than one variable. As an example, the problem of measuring a radio program's audience within a cluster of counties might be considered. Here at least two factors should be controlled. First, there is the question of stratification by income groups (vertical sampling control) to get the proper representation from each economic level. This is necessary because program appeal and listening behavior are related to economic level. Second, since the program's audience is to be measured over a group of counties, the proper stratification by population groups and geographic areas (horizontal sampling control) must be maintained. This is because a program's

appeal varies by size of town and the opportunities for listening to it vary by location in the area because a radio station's signal is not constant in all places.

The plan with a two-way "control" or "stratification" is to decide on the proportion of interviews in each place (horizontal sampling), and then within each place—city, village or rural area—establish the quotas or proportions of interviews by income groups (vertical sampling). To control one of these and not the other may introduce sample bias into the results.

Once the quotas or allocations of interviews are set up for each stratum, the investigators are directed to obtain a cross section of each level (vertical sample), in each place (horizontal sample). Sampling within each stratum is as random as possible. Usually, however, in technical terms, it amounts to accidental sampling within each stratum. But this is much more representative because the final total sample will have the proper number of interviews from each group. By setting up the controls or stratification, the sample is forced into proper balance and is, therefore, more representative.

This plan of stratified sampling is followed, for example, by Elmo Roper (11) in his surveys for *Fortune* and by George Gallup (6) in his American Institute of Public Opinion surveys. The device, as has already been shown, makes possible a more representative sample by imposing restrictions on the investigator's selection of cases for interview.

The technique of stratification, however, has its disadvantages. They arise from two sources: one, that relationships have been established (by prior test) between the variable under study and the different strata; and two, that the ratio or proportion each stratum bears to the total universe has been determined. The first condition is not difficult to handle. Simple experimentation will expose the most obvious relationships and the more subtle can be determined by careful cross-tabulation. The second—correct proportions within each stratum—is troublesome. It means virtually that one must know the proper allocations for any plan of stratification to be followed.

When the A. C. Nielsen Company set out to put its British Food and Drug Index into operation in England, it first had to conduct a census of food and drug stores in order to know how many small, medium and large stores to allocate to its sample of stores. This, of course, was because England has no census of business such as we know in the United States. The Nielsen experience demonstrates the first step in stratification, although in many cases estimates of the total instead of a census would suffice.

The U.S. Census of Population (14) is useful for many groupings, such as age, sex, size of market, geographic area, race, etc. But it does not reveal the allocations of families or individuals by income groups. In this field there is considerable disagreement. For example, two independent research organizations set out to measure the audiences of one evening of broadcasting in

Hartford, Connecticut (5). Below are the "controls" established by each organization.

DIFFERENCES IN SAMPLE DISTRIBUTION BY ECONOMIC LEVELS

Crossley (Pure Recall)			Hooper-Holmes (Aided Recall)		
Median Rentals	Distribution		Rental Values	Distribution	
\$54.00	Class A	26.7%	Over \$83.33.....	Class A	20.9%
\$40.00	Class B	36.7	\$50.00-\$83.32...	Class B	19.8
\$33.00	Class C	30.0	\$41.60-\$49.99...	Class C	17.9
\$25.00	Class D	6.6	Under \$41.60....	Class D	41.4

Even though the actual field techniques for obtaining the audience data had been the same, there is reason to assume the differences in sampling would have contributed significant variations to the final results.

Roper, in his nationwide sampling, maintains six controls: age, sex, population groups, geographic areas, occupation and economic levels. In Roper's sampling by economic levels, he takes into account "geographical variations in average income, as well as the size of place variations in average income." The Roper allocation of interviews by income groups, for the country as a whole, is as follows: A ("prosperous") = 7 per cent; B ("upper middle class") = 25 per cent; C ("lower middle class") = 45 per cent; and D ("poor people") = 23 per cent (10).

The "controlled" or "stratified" method, even though exact proportions for each stratum are not always available, is today's best known method for insuring a representative sample.

**Checking the Representativeness of the Sample.** After a survey employing any one of the three sampling techniques (accidental, random or stratified) has been tabulated, there are ways in which the sample's representativeness can be ascertained. In each interview or mail return, provision is usually (should always be) made for the inclusion of certain identification factors, such as age and sex of respondent; does his family own or rent; does the family have any of the following: automobile, telephone, electricity, radio, refrigerator, gas, and the like.

On most of these factors fairly exact data are available by counties and in summary by many different break-downs. By tabulating for these factors the sample can be checked against the known proportions. The assumption is that if the sample checks on items for which accurate information is available, the findings on the other questions will be representative.

One further consideration regarding representativeness, which is equally

important in all types of sampling, concerns the "not-at-home" cases. If the problem under study is related to age or size of family, for example, missing "not-at-homes" introduces a serious bias. Studies have shown that the "not-at-home" family is usually younger and smaller than the average. Therefore, if the survey involves leisure time activities (such as reading or radio listening) or consumption of foodstuffs, the sample would not yield representative results.

In order to safeguard the sample's representative quality, each case must be accounted for. This applies specifically to random sampling as used in telephone surveys<sup>2</sup> and mail studies. In the latter type of survey the fact that the original mailing may be a random sample of the universe is of little consequence if, through self-selection, the responses do not represent the outgoing list.

**Is the Sample Large Enough?** Experience in the past decade has demonstrated—both in the biological laboratory and in the field of consumer research—that the number of observations or interviews (size of sample) is not nearly so important as the sample's representativeness. Therefore, the trend in the past several years has been toward smaller and more typical samples.

While there are still those who are impressed by large samples, the advanced research worker is not concerned with size *per se*, but rather with the interpretation of his findings in the light of the sample's size. Here the contributions of Brown have been exceedingly helpful in the field of market research (3, 2).<sup>3</sup> Brown has computed a table showing the size of sample required to yield various degrees of statistical accuracy. The size of the total sample necessary for a specific study depends on the sub-groups, or breakdowns, to be made and the expected proportions of the answers, as well as the degree of precision desired. For example, a much larger sample is needed to insure specific limits of statistical accuracy when the answers come out 50 per cent "yes" and 50 per cent "no" than when the response splits 10 per cent to 90 per cent.

In planning a sample, if one can estimate approximately how the critical percentages will fall, *i.e.*, within what range, then the sample size can be determined to within the degree of precision required. When in doubt as to the outcome the recommended procedure is to plan the quota for a 50 per cent-50 per cent split on the important question.

While it is true that the larger the sample the smaller is the statistical error, it does not follow that a large number of cases reduces the sample bias. In the matter of numbers of cases the *Literary Digest* was safe; the difficulty re-

<sup>2</sup> In the coincidental telephone method, it is assumed that "non-answers" are not at home and, therefore, not listening at home.

<sup>3</sup> Brown's table is also available in *The Technique of Marketing Research* (2, pp. 396-402). New York: McGraw-Hill Book Co., Inc., 1937.

sulted from a biased or non-representative sample. In considering the margin of error in any market research study three sources of error must be considered separately: 1) sample bias, 2) sample fluctuations, and 3) method of obtaining the information. This discussion has been confined to the first and second points only, although all three must be examined in accepting the findings of a specific survey.

The size of a sample becomes particularly significant in the interpretation of results. The application of the conventional standard error formula<sup>4</sup> will establish the approximate limits of statistical accuracy of the findings.<sup>5</sup> In many cases, because the sample is small, the differences between two percentage figures are not statistically significant. In other words, the differences may be due to chance, and hence are not "real."

This is one point where little has been done to educate the non-statistically trained business man. While he is quick to appreciate the need for representative sampling—the *Literary Digest* did much to bring this about—he does not grasp readily the theory of random or chance errors and, hence, accepts the difference between any two figures as representing true differences.

Examples of such lack of insight are abundant in connection with the interpretation given to small changes in radio program ratings published by the Cooperative Analysis of Broadcasting (CAB). Here, probably more than any place in market research, differences are considered *per se* without regard to sample size. For example, an evening program broadcast once each week, and checked in each CAB checking city (7), is listed as having an audience of 20 per cent of the radio families. That "rating" of 20 per cent can fluctuate almost 3.0 points in the next report and still be within the range of a chance error due to sample size. Or to put it differently, it would be unsafe statistically to make definite conclusions regarding a change in a program with a "CAB rating of 20" unless the change exceeded 3.0 points above or below 20.0 per cent.

<sup>4</sup> Discussed in Brown's paper (*supra*). It should be pointed out, however, that this is an old formula and is being rapidly discarded for newer small-sample statistics which emphasize the variance in the estimates of the population parameters rather than the particular estimate under consideration. By using these newer methods it is possible to determine the significance of a split at the 50-50 level with the same degree of accuracy that the traditional methods yield only when the split is more marked. For discussions of these newer concepts see Fisher (4) or Lindquist (8).

<sup>5</sup> Some researchers check the adequacy of a sample's total size by successively cumulating a number of small sub-samples until a stabilized value is reached. The assumption is that the sample's overall size is adequate when such a point is attained, *i.e.*, where the addition of more cases does not alter the results significantly. Today's trend is away from this rule of thumb procedure. For a discussion of the plan see Brown (2).

The lack of consideration for sampling errors by the business man—and, for that matter, the lack of application of such measurements by the research man himself—is one of the problems in present day market research that is crying for solution. As time goes on, the problem may correct itself through trial and error, but until it is understood there will be much unnecessary concern over differences that are insignificant and would, in all probability, vanish if the sample were enlarged.

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## 2. Psychology in Market Research

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Reprinted from the *Harvard Business Review*, 1947, 25, 432-443, by permission of the author and of the Graduate School of Business Administration, Harvard College. This article deals with concrete examples of the kinds of things the psychologist can find out for the businessman, thus adding strength to market research in its task of measuring and understanding the interrelations of human needs and their satisfactions.

The fact that the businessman must market his products means that he must deal with people—his customers, the users of his services. The psychologist too deals with people. Both businessman and psychologist are interested in what makes people tick, what motivates them, and how they can be molded and influenced. This article, then, is an exploration of how businessmen can work together with modern psychologists and make use of their fund of special knowledge, particularly in the marketing of consumers' goods.

**Consumer Motivations.** American industry has been fairly successful with machinery and technical processes, and there have also been some attempts to control the more obvious human factors like safety, labor relations, aptitudes, and morale. Likewise definite beginnings have been made in the measurement of markets: We know how to determine sales potentials, we can make product tests, we can measure attitudes, and we know something about the effectiveness of advertising campaigns.

But by and large we are still using outmoded and inefficient methods to determine and understand consumer motivations. We are only scratching the surface. In making marketing decisions, we are relying on surveys based on what people say they think and feel. Yet even in the everyday aspects of modern life we have learned to distinguish between what a man says and what he really means deep down. We know that to deny jealousy, for example, is very frequently only an admission of the emotion. We know that often we do things because of inferiority feelings. We also know that we forget names and objects and tasks because of an unconscious desire not to remember. We know that constant denial of pleasure to a child will frustrate him and that frustration leads to aggression.

In these and many other ways we are, bit by bit, introducing modern scientific thinking into our everyday lives. It would seem to be time to take similar steps in industry and commerce, where an understanding of human

nature is basic and where so much is at stake. For instance, we already know that fear and psychological depressions are more dangerous than economic setbacks; in fact, they often cause such setbacks. The interdependence of cold, sober business statistics and deeply seated human motivations is obvious even to the completely untrained. In marketing, where we have no direct control over the factors with which we must contend and where we must make decisions on the basis of what is at best intangible evidence—here especially we need all the clear insight we can get.

Cooperation between the practical businessman and the psychologist is not just a nice or desirable state; rather it is an essential development if we are to progress from a medicine-man stage of selling and advertising to a scientifically controllable one. Of course the businessman will not and cannot apply to the psychologist for help with all his marketing problems. There are a number of clearly visible situations, however, when he can reasonably assume that normal research resources will not suffice. Questions like the following present real challenges:

1. Do you really know why your customers like or dislike your product? Your customers tell you they bought a particular make of car because of its "performance," "economy," or "trade-in value." Are you sure these are the real reasons? Many surveys have shown that they are but pure rationalizations. They were mentioned in answer to the usual type of questioning because they sounded better, more logical. This becomes clear when you compare the motivating reasons for purchase given by Ford buyers, Plymouth buyers, and Chevrolet buyers; they are exactly the same for all three.

Deeper reasoning, then, must have been at work. Emotional factors such as loyalty, fear, and tradition are usually much more important than the actual quality differences which people are likely to offer as reasons. Obviously an advertising campaign which does not rely on the answers to "surface" questioning but which capitalizes on the actual motivating forces revealed by questioning that digs down into people's minds is much more likely to be effective.

2. Do you know what kind of people your customers are? Although you may know the average age, income, educational level, and so on, of your customers—the factors usually sought for in market surveys—you may still not know the real factors that determine their acceptance or rejection of your product. For example, the degree of customer security or insecurity (in a psychological sense) may be the all-important variable which you have to ascertain before you can market your product intelligently. Suppose the product is a deodorant. The appeals which will influence persons who are desperately anxious to be socially acceptable may fall flat with persons who already feel satisfied with their position.

3. Are you sure you do not insult your customers? Suppose you are in the pipe tobacco business. Your advertising uses colorful language to describe

the aroma of your tobaccos in order to make them sound more desirable than your competitors' products. Yet, unless you are careful, many of the words you use may arouse feminine associations of a nature unpleasant to the pipe smoker, intent as he is on convincing himself of his masculinity. A study showed "aromatic," which on the surface sounds like a perfectly good word, to be of this type. Many times manufacturers run up against other such obscure inhibitions, deep-seated prejudices, hatreds, negative associations, and unconscious forms of resistance which, when uncontrolled, may play havoc with their sales.

These are just a few examples of the kinds of problem which a businessman selling consumer products may run into and which, when attacked by customary means, *i.e.*, either by pure guess work or by inadequate, purely statistical market research, may lead to trouble. In a broad sense, any time a businessman is in doubt about why his customers act the way they do, or, in other words, any time he must deal with a why question, a truly scientific approach to his problem is indicated.

Of course there are many questions that can be answered by the customary type of market research department or outside research agency—as a matter of fact, all those questions where the answers are clear in the customer's mind. The consumer knows how many bottles of beer he consumes in one week, which brand of bread he buys, where he buys his motor oil, and so on. The reader can report that he read only parts of a certain book and which parts they were. The radio listener can reliably inform the researcher that he fell asleep during this program or laughed 14 times during that program.

But the moment the investigator attempts to get the answers to such why questions as what actually made respondents switch from one brand of soap to another, or to find out their true opinions about such matters as various brands of soft drinks, then he is in trouble. What he is doing is the same thing that the physician would be doing if he asked his patient for an explanation of his ills. The patient, looking for some causal relationship, as he saw it, might explain the pain in his right side as due to overwork and strain, whereas actually it might be the beginning of an appendicitis. Of course, the patient might also chance to be right, especially if he had picked up a smattering of physiological knowledge, but the odds are against him. Curiosity, unwillingness to accept superficial explanations, good common sense—all these may help to get the right answer. Nevertheless there are very few of us who, experiencing a bad pain, do not desire to consult the expert, in this case the doctor, because of the importance of having the best possible diagnosis.

**Significance of Findings.** While up to about ten or fifteen years ago businessmen were entitled to assume an attitude of regretful resignation, tinged with hope that their intuitions were right, at the very times when they wanted to be sure that they understood the basic function of their products and

services, this is no longer true. It is not necessary now to face with perplexity, or even to dismiss as unanswerable, questions concerning the apparently mysterious forces that control the success or failure of a product, a magazine, a service, a motion picture, a radio program, or a Broadway show. For modern social psychology has undergone considerable changes over the last decade or so; it has become much more capable of producing practical findings.

Let us look now at some examples of the kind of thing the psychologist can find out for the businessman, thus adding strength to market research in its task of measuring and understanding the interrelation of human needs and their satisfactions. We shall then, in a subsequent section of the article, go on to discuss briefly the technical methods by which such findings are produced.

*The Customer's Inner Needs.* The psychologist can be helpful in finding out the needs and innermost wishes the consumer expects to see fulfilled by a type of product. This is what might be called the functional approach.

In a study the author recently completed for *Time* magazine, direct questioning about why people read *Time* evoked such answers as "It condenses the news for me," or "It is written in a brilliant style," or other similar quality descriptions of the magazine. In the functional research approach, however, we are not so much interested in finding out what people think about the magazine, or what they think they think about it, as we are in finding out what the magazine actually does for them. In the case of *Time*, this approach showed that one of the major functions of the magazine was to provide what the psychologists call "ego-benefits." That is, it bolstered up the readers, because it made them feel like busy executives whose position demanded that they be well informed but whose schedule was so crowded that they needed to get their news quickly. As one reader actually said, in response to deeper questioning: "When I read *Time*, I like myself." Such a statement is quite different from a descriptive remark about the product itself; it depicts a real psychological effect produced on the reader.

Now such a functional finding permits action on the part of the publisher. For example, if he knows that some of his readers are looking for such ego-benefits, then he can make use of this knowledge. The more *Time* offers those readers the opportunity to experience this kind of feeling by the way the magazine is written and edited, the better they like the magazine and the more they are inclined to buy further copies at the newsstand or to renew their subscriptions. Furthermore it can be decided, and actually has been, to make a specific appeal to this feeling in *Time*'s circulation promotion efforts, where a fraction of a percentage point improvement in the rate of returns will add up to a substantial dollars-and-cents savings. Presumably the appeal will be introduced subtly and in such a way as to re-enforce the description of the magazine's quality, features, and services.

It is worth noting, too, that in this way *Time* introduces an important new

aspect into the whole field of education. For hundreds and possibly thousands of years our good-intentioned educators have attempted to convince us that it is not an easy job to increase our knowledge. *Time* encourages and produces the opposite conviction. While the academic archeologist tells you that it takes scores of years really to know the field, *Time* promises you a workable knowledge after only a comparatively few pages of reading.

For the Chrysler Corporation the application of modern functional research operated in the following way. The objective of the executives concerned was to use advertising to get more people to switch from other makes of cars to Chrysler cars. To do this they needed to know why about 75% of all car buyers purchase the same make of a car year after year; they wanted to change that habit. Direct questioning uncovered the apparent reason: rational satisfaction with the quality of the previously owned car. The obvious advertising approach, dealing with such surface rationalization, would have been to stress the fact that the new make of car was startlingly different and better, that it was time to get rid of the old car with all its repair bills and troubles.

From the point of view of the psychological findings this was exactly the opposite of the correct approach. A psychological survey revealed that the real reasons for the high percentage of repeat purchases were based on unconscious fear of automobiles as dangerous, powerful instruments, taking the form of fear of the unfamiliarity of a new make of car, fear of disloyalty to the old car which had demonstrated its safety, emotional attachment to the old car, and similar factors. Instead of talking down the old car, the advertiser needed to compliment the prospective customer on his friendship and loyalty to the presently owned car and to promise him that the new car would permit him to feel the old familiarity within a few hours. The Chrysler executives decided to use this approach in all their advertising and to include it in their sales training courses. The result was a 100% rise in the Starch rating of Chrysler and Plymouth advertisements and a substantial increase in sales.

For the same reasons, the salesmen's usual habit of kicking the tires of old cars brought for trade-in was found to be psychologically detrimental to the transaction. Controlled tests showed that customers actually accepted lower trade-ins when the old car was complimented—"It's easy to see this car was well taken care of"—than when it was deprecated. Thus, functional research reveals the deeper-lying, real motivations for buying behavior and permits correct, effective sales methods to be substituted for others that are often dangerously wrong business-wise.

*Creative Programming.* The same development of functional psychology can also be helpful in presentation of such a product as a radio program. Take the research for the CBS atomic bomb program, "Operations Cross-roads," as an example. The ordinary approach would have been first at the content level—contemplating such considered questions of program format and presentation as whether it should be given in fictionalized form or as a

round-table discussion or as a documentary. The functional approach, however, was to consider the desired effect of the program first, with the idea that the format and content should be subordinated to this all-important goal.

A study of polls and surveys had revealed that about 75% of the public were thoroughly scared by the atomic bomb but had largely chosen to dodge the issue. They wanted to keep the secret or build bigger battleships or have the bomb outlawed, or simply felt that things should be left to take care of themselves—all more or less inadequate solutions. It became clear that if this radio program was to have any effect at all it would have to be in the direction of cutting short all these forms of escapism.

By applying functional research techniques to the study of this problem, it was found that the main program aim should be to convince the listener that he had to face the real issue, which (it seemed to those responsible) concerned the necessity of a world government. Therefore it was necessary to demonstrate to the listener in a step-by-step, almost psychoanalytical procedure, descending from surface forms of escapism to deeper psychological mechanisms, that none of the escapist solutions could possibly work. The method decided on was to stage a series of interviews in which the people questioned began by advocating the escapist solutions and then were forced gradually to admit the illogic of their positions. Once the program had thus indirectly pushed the listener into a corner, so to speak, getting him to admit to himself that all the escapist solutions were inadequate, it then could lead him to positive suggestions. Even though it might enrage him in the course of getting him there, it could leave him at the end of the broadcast with a feeling of encouragement and clarity as to what decision he would have to make.

Once this clear concept of the psychological structure of the program had been worked out in detail, research had come very much closer to defining the job of the creative writer. While all the artistic intuition and sense of drama still had full play in the actual dramatic translation of this concept, the job of arriving at the finished product had been made a lot easier than if the nonfunctional type of research had been the only one applied to this program. Thus, the functional research approach provides a way to bridge the gap between purely descriptive research and creative work.

The same technique can be applied to any other problem in programming and advertising. (It has already been applied in studies of shoes, magazines, candy, chewing gum, and movies.) The first step is to ask what psychological function the message or product should fulfill and how it can be achieved. Then, like a medical practitioner systematically examining several hypotheses suggested by his knowledge of blood, lungs, heart, and so on, the researcher translates the clinical picture into a series of directly observable indices in a questionnaire and makes a quantitative check-up of the various buying, reading, or listening mechanisms which he has reason to think may be involved.

Next comes the creative job of programming or advertising indicated by the research. The final step is a clearly focused test of whether or not the average listener has actually been induced to do what it was intended he should do. In the case of the "Operations Crossroads" program, psychological audience tests indicated the success of the methods used, and this was borne out by the many requests for rebroadcasts, the unusually large number of enthusiastic letters, and so on.

*Dynamic Behavior.* Many research procedures concern themselves quite properly with critical judgments made by the audience, the ad reader, and so on. Often this approach has a static aspect, however. The inquiry is concerned, for instance, with whether a particular advertisement has been accepted or rejected, or how many people have read it—and many advertisers may have a pretty accurate answer to such questions. But much more important than this is a knowledge of what happens in the mind of the reader as he inspects the advertisement. What are his impressions? What is he thinking about? What associations does the advertisement create? What desires or blockages does it mobilize? Even when the advertiser knows the motivations determining purchase of his product, he still has to know whether he is correctly translating these appeals into copy in terms of present-day motivations and needs of buyers.

The dynamic effects produced by advertising and other selling techniques are particularly important now that people are so concerned with help in planning for the future and with guidance in finding their way again within the intricacies of peacetime economy and the transition to a free market. While a company's advertising and sales approach may be technically excellent, special emphasis should be given now to the actual help that sales representatives can give to customers. Several magazine studies showed that the readers were mainly interested in those features which helped them chart the future, which attempted to organize their thinking, and which gave them hope. It is obvious that if the same function were fulfilled by salesmen and advertising, the customer would just as eagerly reach to the product for gratification.

To avoid soliciting meaningless aesthetic judgments from ad readers, the author has developed a procedure whereby the attitude toward the product and its verbal and pictorial associations are matched with the associations and impressions created by an advertisement. Take oleomargarine for an example. Questioning revealed that one of the major prejudices against it stems from a feeling of artificiality, low social acceptance, and general doubt about the composition and nutritive values of the product. It would seem logical, then, that a correctly conceived advertisement would serve the purpose and effect of combating these prejudices and of rendering reassuring information. Yet questioning further revealed that most women visualize margarine as a fatty white substance which is changed into an artificial yellow

by mixing a powder into it, and those asked to react to margarine ads reported that the feeling of artificiality was heightened by the extreme brightness of the ad colors (and in some cases surrealist trees in the ad). There was also a general feeling that a special effort had been made to combat consumer suspicion. Because the readers thought it was done in an obvious, exaggerated fashion, a general feeling of insincerity was created, further increasing the feeling of artificiality.

Phonograph records, especially classical records, constitute another case. When you talk to people about their record collections, they connect records with such things as memorable events in their lives, demonstrate their pride of possession with a sweeping gesture indicating the size of their record collections, and make many other references to the meaning of records in the lives of their families. Today, with a much greater consciousness of being eyewitnesses to history-in-the-making, most people have a heightened desire to enjoy themselves while they can and to hold on to their fast-moving lives in tangible forms. In addition to stressing the quality of records as exemplified by the name of the conductor or singer, the technical processes used in recording, and so on, it simply is good selling psychology to make use of more personal appeals based on what records actually mean to buyers. Yet relatively few of these basic psychological appeals are translated into record advertisements.

If psychological investigation shows a consistent discrepancy between the presently existing product attitude and the effects and impressions created by an advertisement, it is obvious that the ad is not doing the job it could, even though the figures show it to be well read. Research on advertisement effectiveness is another example of the application of modern scientific thinking which can help the sales executive or market research man to gauge the success of his attempts to win and influence the consumer. This research, instead of relying on the erratic, subjective, and static likes and dislikes of ad readers, proceeds on the basis of analysis of basic human emotions, expressions, feelings, and associations, ascertained by objective, scientific, psychological means.

*Multiple Motivations.* Most actions are motivated by a whole field of reasons. In other words, we speak of multiple motivations, all of them interlocking and acting together to produce the final result. Some of these reasons lie within ourselves; others, again, come from the environment. For example, you make love to a girl. Your motivations in doing so may be only partly related to a basic sex urge. You may want to feel powerful, or you may be in need of affection, or you may need to convince yourself of your manliness.

Modern motivational research has to employ methods which can investigate these multiple motivations in their natural structure and mutual relationship without tearing them apart or arranging them in the artificial atomistic order of a check list. A method which the author has tried to develop, taking into

consideration the "personality" approach, is the psycho-panel. A psycho-panel is a representative group of several hundred families about which not only factors such as age, income, and marital status are known (as in the case of the consumer panels which have already proved so helpful in commercial market research), but also personality factors such as whether the individual families are governed by the authority of the father or the mother, whether the members are secure or insecure, resigned or ambitious, overspending or miserly, conspicuous or modest, emotional or rational, escapists or realists, and so on. The psychological needs of the panel members are known specifically, and they can be interviewed and questioned when needed. The continuing relations build mutual confidence between interviewer and panel members and add reliability to the responses secured.

The actual methods of interviewing and testing, such as are used in connection with the panel, will be discussed later. All we want to do here is to bring out the significance for businessmen of the personality factors which can be thus uncovered. For example, suppose two families are found to resemble each other in income, family size, education—in short, they belong to the same group according to the socio-economic criteria of typical consumer research. But the members of one family may have a strong sense of security, be well balanced, optimistic, and have reached a high saturation of their needs; they may be content with the life they can lead on their income. The family next door, however, may consider the same income just a temporary one; its members may be insecure, pessimistic, and overambitious. Advertisers who plan their campaigns efficiently must regard these families as two different units, must remember that the general market is made up of both kinds of family, and must decide which they wish to solicit, and then act accordingly.

Whenever a product attitude appears to be influenced by personality factors, which is the case very frequently, use of the psycho-panel provides an opportunity for confirmation or refutation of the existence of such a relationship, since the files of each family unit in the panel include a long list of personality information gathered by an array of psychological tests, detailed depth interviews, and frequent family contacts. The psycho-panel serves as a sort of X-ray laboratory by use of which we can discover obscure and subtle relationships. For example, if a businessman has a hunch that degree of security influences the buying habits of his particular customers, he can ask questions of the secure and insecure members of the panel and thus find out whether there does exist an actual relationship between this personality factor and buying habits. This turned out to be significant with the deodorant mentioned earlier.

*Rationalization versus Real Motivations.* The discovery of the existence of several levels of consciousness—the ego, superego, and unconscious—is the basis of another reason why modern psychological methods can help market

research. People rationalize their actions and beliefs, try to justify them on moral and logical grounds. We are loath to admit that we sometimes act for completely irrational and possibly idiotic reasons. Almost automatically we construct a fool-proof system of explanations which is completely logical and, if possible, moral and ethical. Psychology, however, teaches us that many of our actions are guided by irrational and emotional reasoning. This is illustrated by many of the examples already cited, particularly that of the reasons for repeat purchases of cars.

Therefore, a research approach not capable of distinguishing between rationalizations and real reasons can go very far astray. The respondent in an interview is frequently unaware of his real motivations to action; they are unconscious. This fact is extremely important. So-called "depth psychology" teaches us that unconscious reasons are usually more basic and powerful than are the conscious ones. Obviously, direct questioning runs no chance of success in uncovering unconscious motivations, so we are forced to introduce new and different methods for the investigation of why problems.

**Research Methods.** The approach the author uses in his work is often termed "depth interviewing." But this phrase does not represent the total picture. It is completely misleading to use the terms "depth interviewing" and "motivational research" interchangeably. Depth interviewing is only one of the methods used in modern motivational research. Other methods are content analysis, laboratory experiments, effectiveness tests, field observations, psycho-panels, and finally statistical methods. (The psychologist, by the way, uses statistical methods to the same extent as any other researcher; the only difference is that he considers statistics a technical tool, like all the other procedures we have just mentioned, and not something which can substitute for sound psychological thinking.) Rather than trying to define these various methods separately, let us try to see how they would all work together in solving a specific problem.

We might have a problem of how believability of the curative effect of a stomach remedy can be achieved: Should it be through logical arguments and testimonials, or through reference to some directly observable feature of the medicine such as its color and consistency—even if illogical? Or we might have a question of the real motivations for buying life insurance: Are they fear and solicitude for the man's family, or are they more in the nature of pride in being a good family man? Or we might want to know why individuals tend to buy ice cream in specific stores: Is it convenience, as they say, even though they will walk by a nearer store selling the same brand, or has it something to do with the feeling of luxury they experience in their favorite store? We might have any of these problems, or a thousand more. But suppose our assignment is to find out the major gratifications of a certain motion picture, that is, what the effects of its showing are on the movie-goers—an

admittedly difficult job since there are so many conflicting factors to be taken into account, but for that very reason requiring added insight.

Our initial task would be to analyze the problem in a psychological sense, to investigate all the possible domains in psychology and sociology which this problem touches. We would thus become somewhat oriented and could see what general fields should be covered in our research—*aesthetics, personality research, leisure time occupations, family organization, mechanisms of emotion, frustrations, and so on.* From this general survey of topics, a systematic procedure evolves. We know we are dealing with communication and that in a psychological sense any form of communication represents a stimulus-response situation.

Suppose, further, that the motion picture is an MGM "Red" Skelton comedy. Because it is a comedy, we would know that we were dealing with the difference in attitudes of people toward reality and toward comedy. In one such film which was investigated by the author, there were a few initial scenes that gave the members of the test audience, although they knew they were watching what was supposed to be a comedy, the idea that all the scenes they were about to see would be realistic. As the story progressed, many of the comic scenes became completely unacceptable because they were seen through the filter of reality set up by the initial scenes, yet they probably would have been satisfactory if seen as parts of a purely comedy plot. In other words, the research had to concern itself with the domains of realism and comedy and with identification.

In such a case there are really three research jobs to do: (1) investigate the stimulus, *i.e.*, the motion picture; (2) study the responding individual or audience member; and (3) study interactions taking place between the stimulus and the respondent, such as identification, emotional response, and so on. All three are aimed at achieving a complete psychological understanding of the problem.

*Psychological Understanding.* Content analysis is used for the first research task. Scripts are taken apart, and we investigate possible psychological stimuli offered by the film, types of characters in the story, settings, and lessons which could possibly be taught by the drama. Here is where we might have become aware that the two contradictory frames of reference, reality and comedy, had become dangerously mixed in the film. In any event, having acquired a familiarity with the operating stimuli of the film, we could approach our second job, the movie-goer analysis, in a sound, direct way.

The movie-goer analysis is handled by the depth interview method (sometimes called "case study" method). This method cannot be explained by calling it a longer interview, an informal interview, or any similar name. It is simply a device which has been used by many clinical psychologists who have been confronted by the problem of finding out why their clients behave in a particular way. It might best be described as a procedure by which the

respondent achieves an insight into his own motivations. In other words, for the respondent it is a sort of introspective method. Psychological laboratories have been using it for decades in the investigation of the complicated workings of the human mind.

In a depth interview the interviewer attempts to bring about a full and spontaneous expression of attitudes from the respondent. It is the proof of a good interview if at its end the respondent has the feeling that he himself has expressed his own reactions. After a satisfactory interview, some people remark, "I never knew that there was so much to going to the movies (or buying a pair of shoes). It just dawns upon me now why I do all these things." Such statements prove to us that we have succeeded in bringing about an understanding in the respondent which permitted him, and us, to perceive the true reasons, the basic motivations for his actions.

In our specific example, psychological interviews revealed a resentment against the comedian, who displayed an inane shirking of life's responsibilities and yet was rewarded with the girl, the job, and the money. The respondents, seeing themselves in the same kind of awkward dilemmas as "Red" Skelton, knew they would surely have to pay for their stupidity; and the fact that he "got away with it" unconsciously upset them.

The third step, investigation of the processes taking place between the stimuli and the respondents, uses another group of methods. It is necessary to study the processes of identification, catharsis, frustration, and other psychological concepts of a relatively complicated nature. Unfortunately they cannot be approached directly, but must be dissolved into their ascertainable components. Identification, for instance, has many ramifications: It must be clearly separated from admiration. There are different forms of identification—some harmful and some desirable. And different factors serve as the basis for identification. In our particular example, we would be concerned with how the men in the audience identified themselves with the film's supposed hero.

At the end of these three research tasks, we often have found sufficiently clear understanding of the problem we tackled to permit action—whether it be in the field of communications, advertising, merchandising, selling, or public relations. In many cases such a grasp of the basic psychological mechanism at work in the effect of a movie, in the acceptance or rejection of a product, and so on, will be the final step.

*Quantitative Data.* In many other cases, however, we would still need more precise quantitative data. In such cases, the preceding psychological research helps in the forming of meaningful hypotheses. And when answers have been collected, counted, and tabulated, we can come up with accurate and significant figures.

To make this clearer, let us take another example—the problem of finding out why one brand of chewing gum was preferred over another. Without

the preliminary psychological research, we might have been inclined to compare the flavors of various brands and to conclude from the expressed preferences for one specific brand that it was better liked because it had a better flavor. Having conducted such research, however, we would know that there were other reasons why this brand was preferred, such as a suggestion of fun (bubble blowing) and a feeling of aggressiveness (tougher chewing). In the questionnaires, therefore, we would try to uncover the extent of such psychological associations, and we would not just ask for flavor preferences but would introduce such clue or indicator questions as: "Which one of these various brands makes you think of fun?" and "Which one makes you think of the feeling of getting your teeth into it?"

In this way, the preceding psychological research helps in developing the kind of questions we need to ask in order to find out the quantitative facts we are after. In the case of the film which we discussed, the questions might be: "Which one of the characters was most like yourself?" "Whom did you have a feeling of trying to help?" By analyzing the answers to such questions, we can begin to measure the strength of the psychological factors involved.

Getting the answers and tabulating the results can be handled in the usual way: by sending out a great number of interviewers or questionnaires to a correctly selected sample of people. Once the returns are in, however, we are able to go far beyond the usual type of cross tabulating of age groups, education, income, and so on, because of the thorough understanding of our hypotheses and the intimate structure of the problems given us by our previous research. We gather our information from apparently widely separated fields and fit it together into a meaningful structure. All the elements of our procedure, beginning with the mass treatment of indicator questions, can be molded into a complete and integrated unit.

Thus, it is possible to deliver a scientifically correct and adequate answer to the initial problem of people's motivations in a specific field; e.g., the film failed to make the audience laugh as much as the producer hoped it would (1) because of the confusion between reality and comedy, in the case of men and women alike, and (2) because of the resentment against "Red" Skelton caused by his getting away with being a "jerk," particularly in the case of the younger men.

What is more, once we understand the mechanism of these motivations, we can also indicate the ways by which improvements can be made. As for the motion picture discussed, the film had already been released to the public and nothing could be done. The practical thing to do with motion pictures, however, would be to test them psychologically before release. It would have been comparatively simple to cut a few feet of film and remove the realistic scenes from the beginning of the "Red" Skelton comedy, thus eliminating the sense of confusion, and also to add a scene at the end in which Skelton stumbled and fell flat on his face, thus sending out the audience with a more

comfortable feeling. Both minor changes would have unquestionably enhanced the picture's commercial success. Similarly, in the case of other types of product, psychological research should be conducted before outlays of possibly thousands of dollars have been wasted in ill-conceived advertising or selling effort.

In summary, then, social psychological research embraces problems which can be solved by merely counting noses, and it also includes problems which necessitate more complicated methods. Because in the last analysis all social psychology is concerned with the individual, his attitude, his motivations, and his behavior, it uses all those methods which help in better understanding of the individual. At the same time, every scientific procedure has to be capable of yielding generalized statements about groups and populations. The single individual can only be understood because of his membership in human society. Any true social psychological method has to be able to cover both these aspects in the most modern and advanced fashion science permits.

Although at first glance it may seem that this kind of psychological research would only add expenditures to already extended research and advertising budgets, the justification for it is similar to that for an X-ray needed to insure better care of a patient. Without the outlay for the X-ray, the treatment may remain ineffective and the cure unduly delayed. With the knowledge provided by real understanding of the causes of difficulties, however, a more concentrated and sharply focused attack on the problem is possible—and quite often at an ultimate dollars-and-cents savings. It is the wise man who knows the value of expert assistance.

Of course there are many problems not important enough to warrant psychological X-rays, and there are many problems where a sound, penetrating, common-sense approach will yield answers which are reliable for all practical purposes. Yet, even here a recognition of the principles discussed in this article can be helpful, if only in stimulating and directing the thinking of a company's regular research department. There still will remain, however, many problems that need and deserve expert assistance from trained psychologists, either on a consulting basis or, in the case of large companies, as a specialized part of the company's own staff.

### 3. Verbal and Pictorial Questionnaires in Market Research

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*Joseph Weitz*

Reprinted from the *Journal of Applied Psychology*, 1950, 34, 363-366, by permission of the author and the American Psychological Association, Inc. An experimental study of two different types of questionnaires commonly used in market research. Evidence is presented which shows that the two questionnaire techniques cannot be used interchangeably as has frequently been done in market research studies.

The purpose of this study was to compare the results obtained from two different types of questionnaires commonly used in market research. The two questionnaires used in this study were a verbal and a pictorial questionnaire. Frequently in a single survey a questionnaire will be used which contains both verbal questions and a choice of pictorial items. The data obtained from these two types of questions are often treated similarly. It is hypothesized in the present study that different results may be obtained using these two techniques. If this is so, it does not seem warranted to treat the results in the same manner nor to evaluate equally the data obtained from these two sources.

**Procedure.** The subject to be studied in this survey is the design of the cooking range. This was chosen since it is generally present in some form in every household and hence people to be interviewed would be familiar with it. Two questionnaires were compared, one verbal and one pictorial, concerning the design of the cooking range. The questions on the verbal questionnaire were as follows:

1. Do you prefer the table top (low oven) or the high oven?
2. Do you prefer a window in your oven?
3. Do you prefer a high or low location for your broiler?
4. Do you prefer burner controls on the back vertical panel or the front panel?
5. Which of the following burner arrangements do you prefer?
  - a. Two burners on each side with work space in the center
  - b. Four burners on one side with work space on the other side
  - c. Four burners staggered across the entire top
  - d. Four burners across the back with work space across the front
  - e. Two burners on each side with a built-in griddle in the center
6. Which of the following do you prefer?
  - a. Oven in the center with storage space on both sides
  - b. Oven on the right with storage space on the left

- c. Oven on the left with storage space on the right
- d. Double oven
- e. A high oven with storage space below
- 7. If you had your choice, what color would you choose for your stove?
- 8. Do you prefer to have toe space at the base of your stove?
- 9. Do you prefer a hinged door or a drawer type storage area?

The visual questionnaire was composed of a series of sketches involving the same discriminations which were asked for in the verbal questionnaire. For example, in question three—do you prefer the high or low location for your

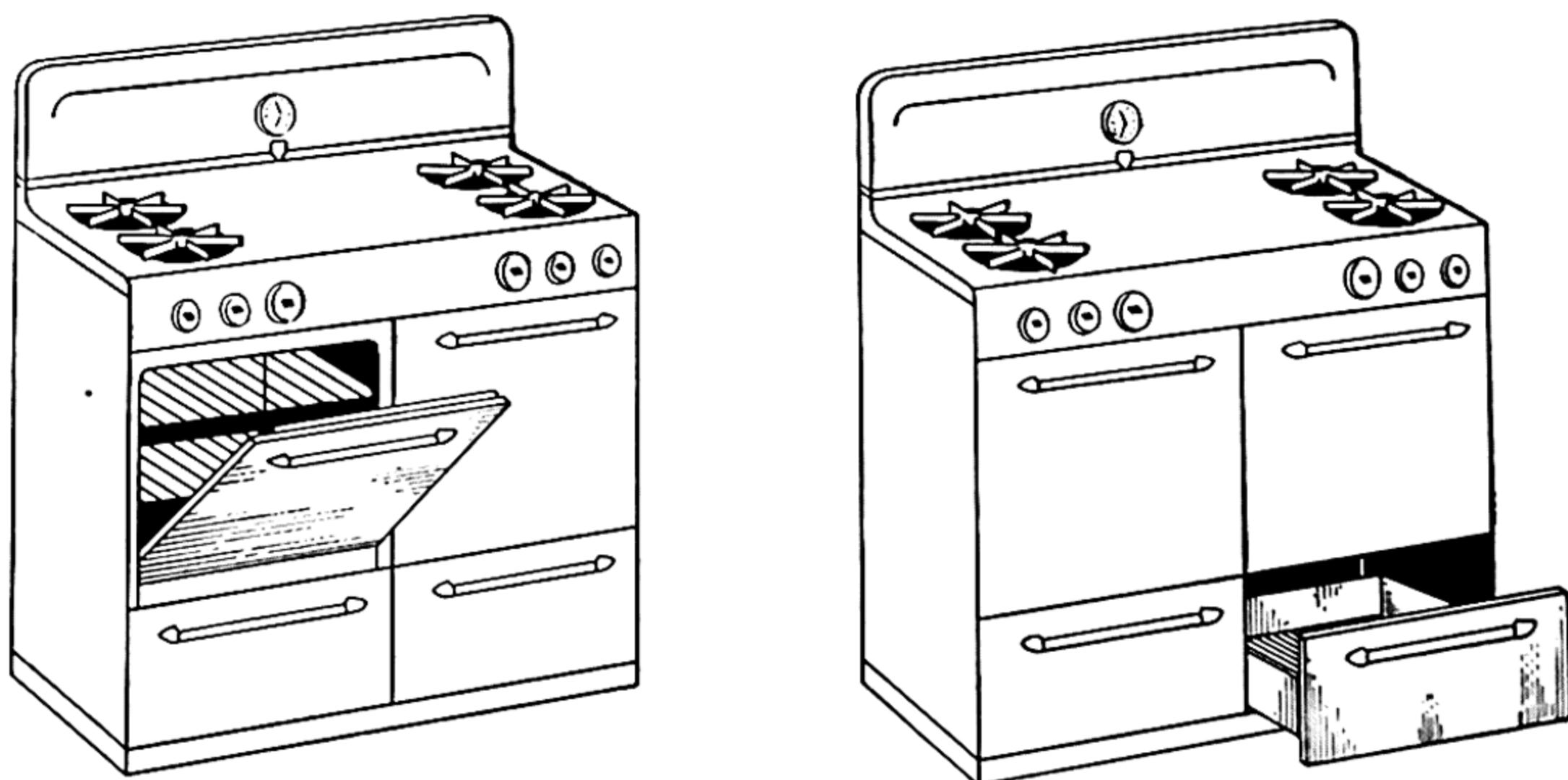


FIG. 1. Sketches used for question 3 in the Pictorial Questionnaire.

broiler?—in the pictorial questionnaire two drawings were made, one with a high broiler and one with a low, both stoves having the same basic design (see Figure 1). The person being interviewed was asked which of these stoves she would prefer. The same was done for all of the other questions.

For both groups other information was obtained, such as educational background, number of years the individuals had used the particular stove they then had, and what type of stove they were using at present. In this paper only the data pertinent to the original hypotheses will be presented.

The survey was conducted in the city of Pittsburgh. The sample consisted of 200 adult females. This total sample was divided into two groups of 100 each; one group received the verbal and one the pictorial questionnaire. In each sample of 100, 10% were from the A or highest socio-economic group; 30% from the B socio-economic group; 40% from the C socio-economic group and 20% from the D socio-economic group. In this way the two groups were matched on the basis of socio-economic background.<sup>1</sup>

<sup>1</sup> *Manual for research associates and interviewers*. New York: Market Research Division, The Psychological Corporation. Part 2, pp. 5-6.

One interviewer was used for all 200 cases. This individual was an experienced interviewer. It was thought necessary to use only one interviewer so as to reduce that variable to a minimum. In both the verbal and pictorial questionnaires the interviewer returned to those addresses where no one was home at the first call. Further, in administering both the verbal and pictorial questionnaire the internal relationships of the sample were maintained during the study. That is, all of the A group were not interviewed before the B, etc.; for example, 1 A was interviewed, then 3 B's, then 4 C's, then 2 D's, etc., so that no one group was completed before starting the next.

**Results.** The results of the study are shown in Table 1. It can be seen that in all cases, with the exception of question two, there was a significant difference at least at the 1% level as determined by the Chi-Square test.

TABLE 1. PREFERENCES OF INTERVIEWEES IN EACH SAMPLE

Question	Choice	Number Preferring		Chi-Square Value	P
		Ver.	Pic.		
1. High or low oven....	High	23	41	8.24	.010
	Low	77	59		
2. Window in oven....	Yes	82	77	.764	.300 to .500
	No	18	23		
3. Broiler location....	High	41	60	7.22	.010
	Low	59	40		
4. Burner controls....	Front	9	27	10.98	.001
	Back	91	73		
5. Burner arrangement..	2 each side	19	36	15.06	.010
	4 one side	57	30		
	4 across top	7	12		
	4 across back	11	11		
	2 each side griddle	6	11		
6. Oven arrangement...	Center	14	18	25.04	.001
	Right	61	30		
	Left	6	5		
	Double	5	5		
	High	14	42		
7. Color.....	White	88	55	27.13	.001
	Not white	12	45		
8. Toe space.....	Yes	94	65	25.77	.001
	No	6	35		
9. Storage.....	Drawer	31	67	26.32	.001
	Hinge	69	33		

On several items there was a complete reversal of the preferred response from the visual to the pictorial questionnaire. In question seven, concerning color preference, the colors other than white were grouped in one category and white in the other category, giving a two by two table rather than a five by two table, which would have been the case had all the colors been used (black, green, cream, blue and white).

Previously it was stated that even though no attempt was made to equate the two groups on the basis of educational background, they turned out to

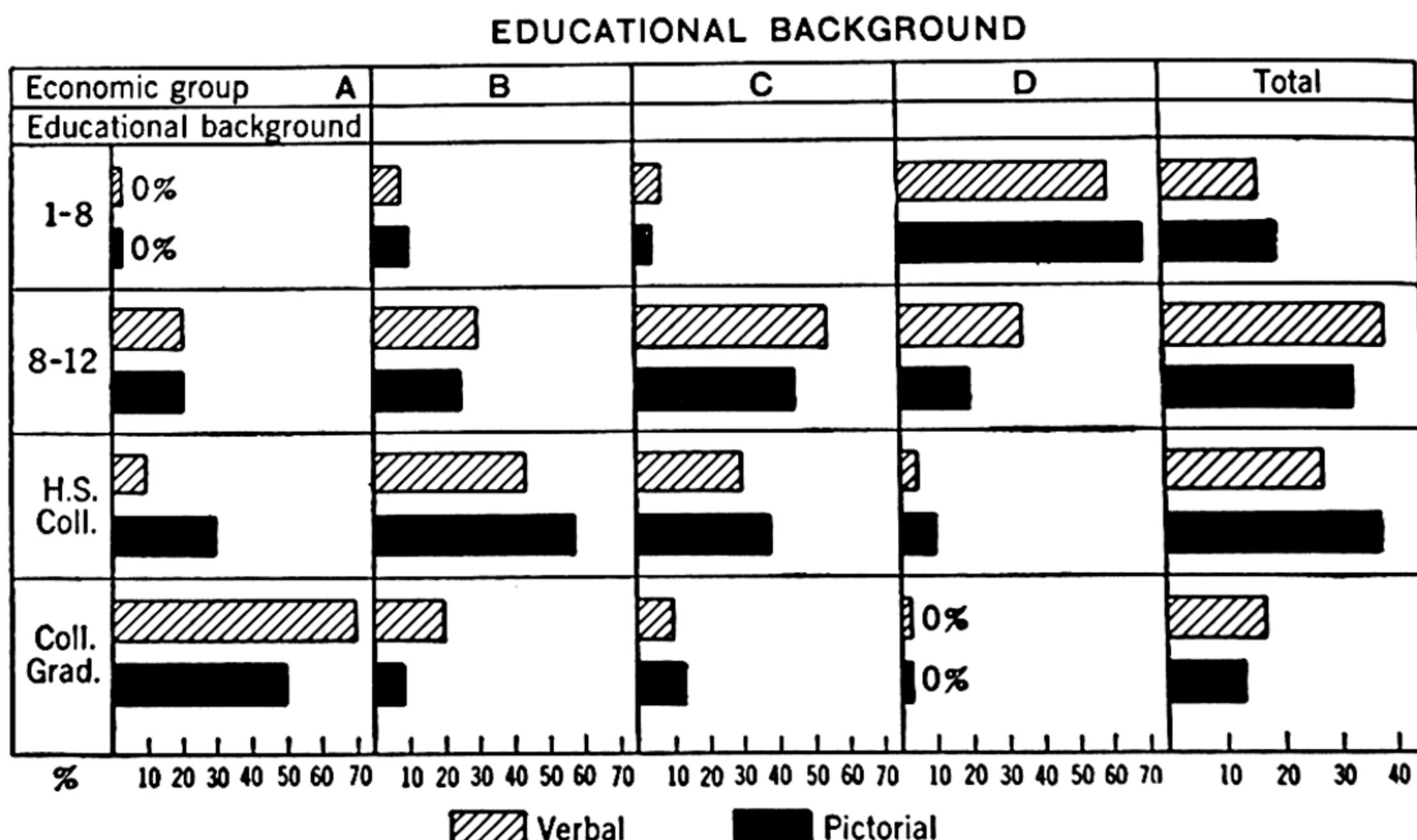


FIG. 2. Educational background of each socio-economic group in each sample.

be quite similar. This can be seen from Figure 2. Since there would be fewer than five cases in some cells if Chi-Square were computed separately for each socio-economic group, all groups were combined to give the total educational level of each sample. From this combination of data the computed Chi-Square results in a value not significant at the 30% level. This then is an added check on the homogeneity of the two samples used and would lend weight to the assumption that any differences which exist are due primarily to the type of questionnaire used. It is of interest to note the change in educational background from the A group to the D group.

It can be seen from Table 1 that the results obtained from the pictorial and the verbal questionnaire cannot be considered as homogeneous. Since the sampling technique was identical for both samples and since there was evidence of homogeneity of the educational background of the two groups, it would seem evident that the differences observed are due to the differences in the questionnaire technique. If this is so, the original hypothesis is substantiated and one must differentially evaluate results obtained in these two ways.

The present study throws no light on the important problem of which of these two methods is more valid. That is, if a survey is to predict consumer behavior it should obviously be important to know which of these techniques, pictorial or verbal questionnaire, comes closer to actual buying behavior. Further research must be done in order to compare the usefulness of these two techniques with respect to their predictive value for consumer behavior.

It should be pointed out that it is possible that had other pictures been used there might have been different results; therefore the pictorial representation itself might be studied to determine the amount of variability obtained with various forms of visual presentation of questions.

#### 4. Dependability of Psychological Brand Barometers. The Problem of Reliability

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*John G. Jenkins*

Reprinted from *Journal of Applied Psychology*, 1938, 22, 1-7, by permission of the American Psychological Association, Inc. This paper deals with the original study of the reliability of the well-known Psychological Brand Barometers. The essential technique is not only of practical utility but also high in measured reliability.

For the past five years psychologists at more than fifty American universities have been contributing their services periodically to the maintenance of a national program of psychological market research. This program, known as the Psychological Brand Barometer, had its inception in a suggestion by Link <sup>1</sup> in 1932 that periodic surveys of buying habits made by psychologically trained investigators at various universities would provide the best possible index to future buying behavior. With the cooperation of psychologists at strategically located universities, the program expanded so rapidly that in 1935 Link and Likert <sup>2</sup> could speak of a series of reports representing the cooperative labors of sixty psychologists in collecting data on the purchasing habits of more than 42,000 housewives. From the start it was apparent that these data could be utilized to predict trends in buying behavior; and in 1936

<sup>1</sup> H. C. Link, *The New Psychology of Selling and Advertising*, 1932, 28.

<sup>2</sup> H. C. Link and R. Likert, *Recent scientific techniques in measuring distribution and factors affecting distribution*, International Congress for Scientific Management, London, 1935, 3.

the Psychological Corporation issued charts<sup>3</sup> which showed their use in detecting distinct buying-trends.

The Psychological Brand Barometer consists in essence of a series of questions regarding the last purchase of a score of commodities made by the respondent. "These barometers utilize, as measures of distribution, a psychological yardstick, namely the buying habits of comparable groups of customers. Periodically, in nation-wide interviews, people are asked: 'What brand of coffee did you buy last?' 'What soap did you use last for washing dishes?' 'What cigarette are you smoking now?' etc. . . . The Psychological Brand Barometer . . . is not a measure of sales in the ordinary sense. It is a measure of customers. Its unit of measurement is not dollars or pounds but people. Its purpose is to reveal whether more or fewer people are buying a given article, and to show such trends in relation to competing articles in the same group."<sup>4</sup>

The practical utility of the method may be regarded as definitely established. For certain commodities, and with proper interpretation of statistical indices, the results already obtained have demonstrated that last-purchase questions can supply the most sensitive indicator of buying-trends thus far developed. No small number of commercial organizations have been sufficiently impressed with the value of the Brand Barometers to pay well for their use. Certain other organizations, it may be remarked, have demonstrated their high appreciation of the method by appropriating it for their own use, without the benefit of psychologists to administer the questions or to interpret the results.

Granting the practical utility of the method, we are still confronted with the necessity of subjecting it to precisely the same tests of dependability which we should employ in testing any other psychological instrument. We must attempt to discover whether the last-purchase questionnaire actually yields a reliable and valid depiction of our respondents' buying habits or whether the good practical results are due to some less obvious set of conditions. We must find out, in other words, whether people are consistent in naming the last brand of a commodity purchased and whether their statements actually represent their most recent purchases.

**Measurement of Reliability.** The familiar technique of repeating interviews with an identical sampling of respondents was employed in measuring reliability. A group of trained undergraduate interviewers went to 150 assigned B-group homes and filled out there the regular Barometer interview blanks. There were twenty-six questions on this particular blank; nineteen of them were typical last-purchase questions, the remainder being scattered among other types. Our investigation was concerned only with the last-pur-

<sup>3</sup> These charts, privately published in the form of lantern slides, are available to psychologists on application to the Psychological Corporation.

<sup>4</sup> H. C. Link and R. Likert, *op. cit.*, 3.

chase questions. As soon as the interviewers turned in the completed interviews, each sheet was assigned an identifying code-number.

Forty-eight hours after the original interviews, the same interviewers went again to the same homes, asked to interview the original respondent, and, if successful in obtaining the repeat-interview, explained that the original sheet had been lost, and asked the respondent to submit to a second interview. The affability of the respondents was surprising; where we had expected to obtain less than 75 per cent of the repeat interviews, we actually obtained better than 90 per cent. After discarding all sheets which involved a change in respondents between the two interviews, we had, as a result, 100 pairs of blanks<sup>5</sup> representing the answers of the same interviewees given by the same interviewers under the same general conditions. These pairs were now arranged by code-number and were submitted to an item-by-item analysis in order to determine the nature and the extent of changes made in answers on the repeat-interview.

The results, subdivided by commodities, are given in Table I.

TABLE I. SHOWING THE PERCENTAGE OF RESPONDENTS NAMING THE SAME BRAND ON REPEAT INTERVIEW

Commodity	Per Cent of Respondents Naming Same Brand
Beer (home).....	97
Tomato juice.....	93
Cigarette (women).....	93
Toilet soap (men).....	91
Face powder.....	91
Scouring powder.....	91
Gasoline.....	91
Coffee.....	90
Mouthwash.....	90
Motor oil.....	90
Beer (away).....	90
Toilet soap (women).....	89
Cigarette (men).....	89
Toothpaste.....	88
Face cream.....	88
Flour.....	88
Shaving soap.....	88
Hand lotion.....	87
Tires.....	85
<hr/>	
Average.....	90.0
A.D.....	1.8

<sup>5</sup> Of the 100 complete interviews finally paired and employed in obtaining our data, 76 were with housewife only, 3 with husband only, and 21 with husband and wife.

Perhaps the most striking thing about these results is the high agreement on reliability for the wide variety of commodities indicated. Even with all of the items included, the A.D. of 1.8 would seem to indicate that the high reliability of the method was relatively independent of the class of product investigated. And when we eliminate the figures for two products for which special determinants are known to be operating, the total range of indices of reliability runs only from 87 per cent to 93 per cent. (The index for beer consumed is out of line because almost all of the respondents denied consumption at home. The index for tires is brought down to a lower figure by the common confusion between "Goodrich" and "Goodyear"; three respondents changed answers from Goodrich to Goodyear while two changed in the other direction.) The conclusion seems inescapable that our sampling in the "B" group was consistent in supplying the name of the brand last purchased, that is, that the last-purchase question ranks high in reliability, at least within the limits of this investigation.

The same data may be used to supply answers to two other questions. The first concerns the variability shown by individual respondents, while the second has to do with the practical outcome of the shifts with regard to the trade-names listed. The first question arises from the fact that it would be theoretically possible to have obtained a gross reliability index of 90 per cent in quite different ways. We might have had 90 interviewees who made no changes in the repeat interview, in combination with 10 who changed every answer; we might have had 100 interviewees who changed 1.9 answers apiece; or we might have had any other combination between these limits. The figures in Table II supply the answer to this query:

TABLE II. SHOWING THE NUMBER OF CHANGES PER RESPONDENT ON THE TOTAL QUESTIONNAIRE

18 sheets showed 0 changes				
29	"	"	1	"
24	"	"	2	"
15	"	"	3	"
8	"	"	4	"
2	"	"	5	"
2	"	"	6	"
2	"	"	7	"

(there were 19 questions on each sheet)

The results show that only 14 respondents changed more than three answers on their repeat interviews, and this figure must be balanced against the 18 respondents who made no changes. In general the results point to a fairly uniform level of few changes.

Our second question is one of considerable practical significance. When people change their answers, is there any specific drift detectable in these changes? The writer had long secretly espoused a theory that when people

first responded to a questionnaire, they would tend to supply well-known trade-names in cases of doubt as to their actual purchases and that, if given a second chance after opportunity to refresh their memories, they would change away from the widely advertised brands. If this theory were true, the group should show a drift away from the better known brands on the repeat interviews. To check the actual nature of the shifts, an analysis was made of the direction of change for each commodity. Obviously it is impossible to reproduce any considerable part of this analysis within the limits of this report. There was, however, such a high degree of consistency in the results that a single illustration may serve to answer the question. This is provided in Table III.

TABLE III. SHOWING THE CHANGES FOR BRANDS OF TOOTHPASTE NAMED ON REPEAT INTERVIEWS

Trade-Names	Gains	Losses	Net Change
Pepsodent.....	4	3	+1
Colgate.....	1	2	-1
Squibbs.....	1	1	0
Listerine.....	2	1	+1
Ipana.....	2		-2
Dr. West.....	1	1	0
Dr. Lyons.....		1	-1
Prep.....	1		+1
None and Don't Use.....		3	-3

The data in this table show two things. First, it will be noted that the net effect of the shifts is small. This is true in the case of all the other questions, many of which show a considerably larger number of zeros in the "Net Change" column. When the complete results were shown to the statistical staff of the Psychological Corporation, they were unanimous in affirming that none of the changes was large enough seriously to affect the predictive value of the total. Second, it is apparent that there is no consistent shift toward or away from the more widely advertised brands—a state of affairs which obtains throughout the interview-blank.

In stating that the data point to a reliability of about 90 per cent, we have, of course, failed to give the last-purchase questions the benefit of any allowance for actual changes due to new purchases made in the forty-eight hours intervening between the two interviews. It is quite certain that some percentage of the changes should be credited to new purchases, but there is no trustworthy way of estimating the amount for our sampling. We may assume that the correction for new purchases would be relatively small in

the case of tires and possibly quite large in the case of such commodities as cigarettes, coffee, and the like. There is no reason to assume that even the most precise correction for this factor would change the index of reliability sufficiently to have any practical significance. In any event, it would tend to raise, and not to lower, the indicated reliability.

### CONCLUSIONS

Using the technique of repeated interview with the identical sampling of respondents, it has been shown that the last-purchase questions employed yielded an index of reliability of 90 per cent. The small range of values for the wide variety of products studied is taken to mean that the obtained index of reliability is relatively independent of the nature of the product. It appears that the essential technique of the Psychological Brand Barometers is not only demonstrated to be of high practical utility, but that it is also shown to be high in measured reliability. The problem of validity will be discussed in a later paper.

## 5. Dependability of Psychological Brand Barometers. The Problem of Validity

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*J. G. Jenkins  
H. H. Corbin, Jr.*

Reprinted from the *Journal of Applied Psychology*, 1938, 22, 252-260, by permission of The American Psychological Association, Incorporated. A study of the validity of the Brand Barometer through a checking of the responses given to last-purchase questions against the sales checks of the store in which the respondents most regularly shopped. Indices of validity varied from product to product, ranging from 62 to 100 per cent.

In a recent article,\* the senior author reported the results of an investigation regarding the reliability of last-purchase questions of the type employed in the Psychological Brand Barometer. In this investigation it was found that a second set of interviews with the same sampling of respondents after a lapse of 48 hours yielded an index of reliability of .90. In other words, respondents showed a marked tendency to be consistent in naming the brands of commodities most recently purchased.

\* Dependability of Psychological Brand Barometers: I. The Problem of Reliability. *Journal of Applied Psychology*, 1938, 22, 1-7.

The question of validity was still to be answered. In one sense, of course, it is unnecessary to attempt to measure validity: if those who work with the Barometer are content to specify that they are correlating other factors only with respondents' answers, perfect validity is inherent in the answers themselves. If, on the other hand, they assume that the brand named as purchased can be used as an index of the brand actually purchased, the validity of the assumption must be tested empirically. It is theoretically possible for this method—or any other, for that matter—to rank high in practical utility while standing very low in validity as measured by co-variability with the assumed criterion. Thus the fact that the Barometers have shown high utility in predicting sales trends cannot be regarded as demonstrating *ipso facto* that responses to these questions accurately reflect individual purchases. In order to show that the practical utility of the method does not rest on adventitious factors, it is necessary to investigate empirically the relationship between answers on last-purchase questions and actual last purchases of an adequate sampling of respondents.

At the outset the method of measuring this relationship appeared to be fairly simple and straightforward. One had only to obtain responses to last-purchase questions and then to compare these responses with objective records of actual purchases—apparently an easy enough assignment. It was first suggested that data on actual purchases should be collected by means of a pantry-survey, but this method was not adopted because a survey in a small sampling of homes showed that in order to determine which had been bought most recently, one would have had to rely on the housewives' word, thus introducing undesirable subjective factors.

It was finally decided to check against the most direct system of objective records available—the daily sales-slips of a local store. Realizing that the regular Barometer questions were frequently concerned with items bought only at long intervals, we sought to establish a list of articles bought at short intervals at this one store, hoping thus to avoid endless checking of sales-slips. A questionnaire was finally formulated containing only questions regarding commodities which satisfied the criterion of frequency of purchase. The merchant then supplied a list of customers who bought most of their requirements in his store, and a group of trained undergraduate interviewers carried our questionnaire to the homes on this list.

The completed questionnaires were then checked against the entries on the sales-slips—and the attempt was abandoned after the check had been completed. In the interest of future investigations we cite the reasons which made it necessary to discard the data thus laboriously collected:

1. The merchant had supplied only names of those who supposedly bought most of their requirements from him, but events proved that he had overestimated the loyalty of his clientele. The questionnaire required the respondents to state

where they had purchased each article, and they named other stores in so many cases as to reduce the useful data almost to the vanishing point.

2. The book-keeping system of this particular store exhibited a curious lack of objectivity. An entry reading simply "Corn Flakes," we were told, always meant X-Brand Corn Flakes. This notation was followed, we found, except in the case of certain regular customers, for whom it meant the brand habitually purchased, which might be the A-, B-, or Z-Brand. The clerks expressed surprise, indeed, that anyone should question the comprehensibility of such a system!

Having discarded this first set of data, we sought to find a store which possessed a more reliable group of regular customers and a less cryptic system

Name of respondent	Address	Brand	Store
1. What brand of coffee did you buy last?			
2. What brand of butter did you buy last?			
3. What brand of washing soap did you buy last?			
4. What brand of crackers or cookies did you buy last?			
5. What brand of bread did you buy last?			
6. What brand of flour did you buy last?			
7. What brand of hot or cold cereal did you buy last?			
8. What brand of package dessert did you buy last?			
9. What brand of cheese did you buy last?			
10. What brand of canned soup did you buy last?			
11. What brand of canned vegetable did you buy last?			
12. What brand of canned fruit did you buy last?			
13. What brand of mayonnaise or salad dressing did you buy last?			

Interviewer

FIG. 1. Last-purchase questionnaire.

of recording purchases. The cooperation of the store finally selected was an important factor in making this study possible. With the aid of their office force, a questionnaire dealing only with items frequently purchased was made up. After preliminary revisions, the questionnaire finally assumed the form shown in Figure 1.

The selection of respondents was carried out in the following fashion. More than 1,000 accounts were examined for the months of February and March, 1937, with the aim of selecting only those respondents who had purchased at least nine of the thirteen listed articles at this store during that two months' period. In all about 120 accounts were found which satisfied these criteria and which the store manager indicated as current heavy purchasers. Undergraduates with previous experience at Barometer interviewing were instructed in the use of our last-purchase questionnaire and were then sent to all of the names on this list.

As in the study of reliability, the interviews proved easy to obtain: despite such diluting influences as temporary absence from town, illness, and rare

cases of direct refusal to submit to an interview, 96 of the 120 respondents granted complete interviews. Inspection of the resulting blanks showed that 26 respondents did not report any purchases at this store when asked to specify place of purchase, and their blanks were accordingly set aside. The remaining 70 interviews satisfied our criteria and were used to supply the data reported in this paper. In all cases the number of interviewees who purchased a particular commodity falls somewhat below 70, for no customer had bought all thirteen items at this store as his most recent purchase. For nine of the thirteen items the number of respondents actually reporting is more than 50; in three cases, the number reporting was between 40 and 50; and in one case (canned fruit) it dropped to 34. All of these figures are large enough to be significant in a preliminary study of this sort.

The data on percentage of agreement ("validity index") are shown in Table I. An entry of 100 per cent for bread means that 100 per cent of the

TABLE I. SHOWING PERCENTAGE OF AGREEMENT BETWEEN BRANDS REPORTED AS LAST PURCHASED AND SALES-SLIP RECORDS OF ACTUAL LAST PURCHASES

Commodity	Percentage of Agreement
Bread.....	100
Salad dressing.....	93
Canned soup.....	90
Coffee.....	88
Butter.....	84
Canned fruit.....	78
Soap.....	72
Canned vegetable.....	71
Crackers.....	70
Cereal.....	70
Package dessert.....	67
Cheese.....	63
Flour.....	62
Mean.....	77.5
A.D.....	10.4

respondents named as their most recent purchase the brand of bread actually shown as bought on their respective sales-slips. Likewise, an entry of 70 per cent for cereal means that 70 per cent of the respondents named the brands shown as purchased on sales-slips, while 30 per cent named brands other than those shown on the slips.

From these results it is obvious that the indices of validity do not exhibit the uniformity from product to product that was characteristic of the figures for reliability. The latter grouped in striking fashion around the average figure of 90 per cent (A.D. 1.8): there was little to suggest that reliability of response was to any extent a function of the product under consideration. The indices of validity show no such apparent grouping; the wide range and

relatively high A.D. (10.4) seem to show that there is wide variation from commodity to commodity in the accuracy with which our respondents reported their actual brand-purchases. Although the range is wide enough to suggest that separate determinations of validity must be made for each type of product, the general average of these figures for validity is encouragingly high (78 per cent).

Consideration of these results suggests the theory that the variation in validity may simply be a function of the number of brands available in each category. That is to say that bread may have obtained its high index of validity (100 per cent) because the store handled only one brand and flour its low index (62 per cent) because the customers could choose among many brands. If this position be tenable, we shall expect to find a high inverse relationship between the number of brands reported as bought and the respective indices of validity. A glance at Table II will suffice to show that no marked

TABLE II. COMPARING RANK ORDER OF VALIDITY-INDICES WITH NUMBER OF BRANDS NAMED AS BOUGHT

Commodity	Rank Order of Indices of Validity	Number of Brands Reported as Bought
Bread.....	1	6
Salad dressing.....	2	7
Canned soup.....	3	4
Coffee.....	4	13
Butter.....	5	3
Canned fruit.....	6	7
Soap.....	7	14
Vegetables.....	8	8
Crackers.....	9.5	10
Cereal.....	9.5	17
Dessert.....	11	6
Cheese.....	12	14
Flour.....	13	6

relationship obtains. The data unfortunately do not lend themselves to the computation of a rank-order correlation, but it will be noted that the highest index is obtained for bread with six brands named as bought and the lowest for flour with the same number of brands. The larger numbers do tend toward the lower end of the table, however, as may be seen from the fact that the first six items average 6.67 brands named as bought, while the last six items average 10.2 brands.

A more fruitful course is suggested when we examine the theory that respondents are most accurate in naming brands in the case of items for which

one or two brands dominate the purchases. If, for example, we arbitrarily set our standard of dominance by describing as dominant any brand which was named as bought by more than 20 per cent of the respondents, the results are as shown in Table III. The percentages for the first six items tend to

TABLE III. SHOWING RELATIONSHIP BETWEEN DOMINANCE \* AMONG BRANDS AND INDICES OF VALIDITY

Commodity	Rank in Validity	Number of Dominant * Brands	Percentage of Total Represented by Dominant * Brands
Bread.....	1	1	78
Salad dressing.....	2	3	84
Canned soup.....	3	2	80
Coffee.....	4	2	57
Butter.....	5	2	98
Canned fruit.....	6	1	74
Soap.....	7	1	23
Vegetable.....	8	1	60
Crackers.....	9.5	1	30
Cereal.....	9.5	0	0
Dessert.....	11	1	58
Cheese.....	12	1	63
Flour.....	13	2	77

\* A brand is described as dominant if it was named by 20 per cent or more of the respondents.

run higher than the percentages for the last six items. Again to employ our crude method of comparison, we note that the average per cent of dominance for the first six items is 78.5 per cent, while the average for the last six items is 48.0 per cent.

Neither of the relationships just under consideration approaches a simple straight-line progression. Taken in combination, however, they do suggest that the variation in the correctness with which people name the brands last bought may be influenced both by the number of brands available and by the dominance of certain leading brands of those commodities. There is nothing to suggest that the commodities lend themselves to any regular grouping with regard to validity and nothing to imply that a priori statements regarding validity would carry much significance. All of our data seem to point to the conclusion that independent determinations of the accuracy of report must be made for each commodity if it is necessary to take this into consideration.

### CONCLUSIONS

A previous investigation has shown that last-purchase questions have very high reliability; that is, that respondents tend strongly to name the same brand when asked to repeat their answers to last-purchase questions. In the investigation here reported, the degree of agreement between brands named as last purchased and objective records of actual purchases has been shown to vary over a wide range. In the main, indices of validity obtained in this manner tend to run high: of the 13 commodities studied ten show validity-indices above 70 per cent and none falls below 60 per cent. There is some evidence to show that the degree of correspondence varies with the number and dominance of the brands concerned. The two studies are taken jointly to show that, while one may safely assume the reliability of last-purchase questions, empirical investigation is necessary for each product whenever it becomes desirable to deal with validity.

It should be noted that the indices of validity reported in this study are probably reduced to some degree by the fact that housewives may have made more recent purchases at some store other than the one they reported. It was necessary to assume the correctness of their report as to place of purchase in order to use the method we employed.

## Part Nine: INDUSTRIAL LEADERSHIP

### 1. Conditions of Effective Leadership in the Industrial Organization

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*Douglas McGregor*

Reprinted from the *Journal of Consulting Psychology*, 1944, 8, 55-63, by permission of the author and of the American Psychological Association, Inc. This discussion of relationships among people at work directs attention to the whole individual living and interacting within a world of other individuals. The minimal conditions influencing the subordinate's feelings of security and under which the subordinate can realize his own potentialities are discussed. Upon the fulfillment of these conditions rests the success or failure of the superior-subordinate relationship at every level of the industrial organization from that of vice-president to that of the worker.

This discussion of relationships among people at work is written from the point of view of dynamic psychology which, because of its origin in the clinic, directs attention to the whole individual living and interacting within a world of other individuals. Life, from the point of view of dynamic psychology, is a continuous striving to satisfy ever-changing needs in the face of obstacles. The work life is but a segment—although a large one—of the whole.

**The Setting.** Within this framework we shall examine some of the important forces and events in the work situation which aid or hinder the individual as he strives to satisfy his needs. First of all, we must recognize a fundamental fact: the direct impact of almost all these forces upon the individual is through the behavior of other people. This is obvious when we speak of an order from the boss, or pressures exerted by fellow workers to get the individual to join a union. It is perhaps less obvious when we speak of the impact of the business cycle, or the consequences of a fundamental technological change. Nevertheless, the direct influence of these forces on the individual—whether he is a worker or a plant manager—occurs through the medium of the actions of other people. We must include not only the easily observed actions of others, but subtle, fleeting manifestations of attitude and emotion to which the individual reacts almost unconsciously.

For purposes of discussion we may arbitrarily divide the actions of other people which influence the individual in the work situation into three classes:

actions of superiors, of subordinates, and of associates. We shall limit our attention mainly to the actions of superiors as they affect the subordinate in his striving to satisfy his needs. This relationship is logically prior to the others, and it is in many ways the most important human relationship in industry.

The fundamental characteristics of the subordinate-superior relationship are identical whether one talks of the worker and the supervisor, the assistant superintendent and the superintendent, or the vice-president and the president. There are, to be sure, differences in the content of the relationship, and in the relative importance of its characteristics, at different levels of the industrial organization. The underlying aspects, however, are common to all levels.

**The Dependence of the Subordinate.** The outstanding characteristic of the relationship between the subordinate and his superiors is his dependence upon them for the satisfaction of his needs. Industry in our civilization is organized along authoritative lines. In a fundamental and pervasive sense, the subordinate is dependent upon his superiors for his job, for the continuity of his employment, for promotion with its accompanying satisfactions in the form of increased pay, responsibility and prestige, and for a host of other personal and social satisfactions to be obtained in the work situation.

This dependence is not adequately recognized in our culture. For one thing, it is not consistent with some of our basic social values. The emphasis is usually placed upon the importance of the subordinate's own efforts in achieving the satisfaction of his needs. Nevertheless, the dependence is real, and subordinates are not unaware of it. Among workers, surveys of attitudes invariably place "fair treatment by superiors" toward the top of the list of factors influencing job satisfaction.<sup>1,2</sup> And the extent to which unions have attempted to place restrictions upon management's authority reflects not only a desire for power but a conscious attempt to reduce the dependence of workers upon their bosses.<sup>3,4</sup>

Psychologically the dependence of the subordinate upon his superiors is a fact of extraordinary significance, in part because of its emotional similarity to the dependence characteristic of another earlier relationship: that between the child and his parents. The similarity is more than an analogy. The adult subordinate's dependence upon his superiors actually reawakens certain emo-

<sup>1</sup> Harold B. Bergen, "Measuring Attitudes and Morale in Wartime," *The Conference Board Management Record*, 1942, IV, 101-104.

<sup>2</sup> Robert N. McMurry, "Management Mentalities and Worker Reactions," *Advanced Management*, 1942, VII, 165-172.

<sup>3</sup> Robert R. R. Brooks. *When Labor Organizes* (New Haven: Yale University Press, 1938).

<sup>4</sup> Twentieth Century Fund. *How Collective Bargaining Works: A Survey of Experience in Leading American Industries* (New York: The Fund, 1942).

tions and attitudes which were part of his childhood relationship with his parents, and which apparently have long since been out-grown. The adult is usually unaware of the similarity because most of this complex of childhood emotions has been repressed. Although the emotions influence his behavior, they are not accessible to consciousness under ordinary circumstances.

Superficially it may seem absurd to compare these two relationships, but one cannot observe human behavior in industry without being struck by the fundamental similarity between them. Space limitations prevent elaboration of this point here, in spite of its great importance.<sup>5</sup>

There are certain inevitable consequences of the dependence of the subordinate upon his superiors. The success or failure of the relationship depends on the way in which these consequences are handled. An understanding of them provides a more useful basis than the usual "rules of thumb" for a consideration of problems of industrial relations. These consequences of the dependence of the subordinate will be discussed under two main headings: (1) the necessity for security in the work situation, and (2) the necessity for self-realization.

**The Necessity for Security.** Subordinates will struggle to protect themselves against real or imagined threats to the satisfaction of their needs in the work situation. Analysis of this protective behavior suggests that the actions of superiors are frequently perceived as the source of the threats.<sup>6</sup> Before subordinates can believe that it is possible to satisfy their wants in the work situation, they must acquire a convincing sense of security in their dependent relationship to their superiors.

Management has recognized the financial aspects of this need for security, and has attempted to provide for it by means of employee retirement plans, health and accident insurance, the encouragement of employee credit unions, and even guaranteed annual wages.<sup>7</sup> However, this recognition does not get

<sup>5</sup> The relevant literature is vast. A fair introduction to it may be obtained through the following: Walter C. Langer, *Psychology and Human Living* (New York: D. Appleton-Century Co., 1943); A. H. Maslow and Bela Mittelmann, *Principles of Abnormal Psychology* (New York: Harper & Brothers, 1941); John Dollard, Leonard W. Doob, and others, *Frustration and Aggression* (New Haven: Yale University Press, 1939); John Levy and Ruth Munroe. *The Happy Family* (New York: Alfred A. Knopf, 1941).

<sup>6</sup> Cf., for example, the detailed observation of the "bank-wiring" group at the Hawthorne Plant of Western Electric, reported in Chaps. XVII to XXIII of F. J. Roethlisberger and W. J. Dickson, *Management and the Worker* (Cambridge, Mass.: Harvard University Press, 1939). For evidence at another level of the industrial organization, see Conrad M. Arensberg and Douglas McGregor, "Determination of Morale in an Industrial Company," *Appl. Anthropol.*, 1942, I, 12-34.

<sup>7</sup> Discussions of plans for financial security will be found in the research reports of the National Industrial Conference Board and the Personnel Division

at the heart of the problem: the personal dependence of the subordinate upon the judgments and decisions of his superior.

Labor unions have attacked the problem more directly in their attempts to obtain rules governing promotions and layoffs, grievance procedures, arbitration provisions, and protection against arbitrary changes in work-loads and rates.<sup>8,9</sup> One important purpose of such "protective" features in union contracts is to restrict superiors in the making of decisions which, from the worker's point of view, are arbitrary and threatening. They help to provide the subordinate with a measure of security despite his dependence on his superiors.

**The Conditions of Security: An Atmosphere of Approval.** There are three major aspects of the subordinate-superior relationship—at any level of the organization—which affect the security of the subordinate. The most important of these is what we may term the "atmosphere" created by the superior.<sup>10</sup> This atmosphere is revealed not by what the superior does but by the manner in which he does it, and by his underlying attitude toward his subordinates. It is relatively independent of the strictness of the superior's discipline, or the standards of performance which he demands.

A foreman who had unwittingly created such an atmosphere attempted to establish a rule that union officials should obtain his permission when they left the job to meet with higher management, and report to him when they returned. This entirely reasonable action aroused intense resentment, although the same rule was readily accepted by union officials in another part of the plant. The specific actions were unimportant except in terms of the background against which the subordinates perceived them: an atmosphere of disapproval in the one case and of approval in the other.

Security for subordinates is possible only when they know they have the genuine approval of their superior. If the atmosphere is equivocal, or one of disapproval, they can have no assurance that their needs will be satisfied, regardless of what they do. In the absence of a genuine attitude of approval subordinates are threatened, fearful, insecure. Even neutral and innocuous actions of the superior are regarded with suspicion. Effective discipline is

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of the American Management Association, and in the publications of the Policy-holders' Service Bureau of the Metropolitan Life Insurance Company.

<sup>8</sup> Cf. United States Department of Labor, Bureau of Labor Statistics, *Bulletin* No. 686, *Union Agreement Provisions* (Washington, Government Printing Office, 1942).

<sup>9</sup> Sumner H. Slichter, *Union Policies and Industrial Management* (Washington: The Brookings Institution, 1941).

<sup>10</sup> The vital importance of this attitude in familiar superior-subordinate relationships is stressed everywhere in the literature of dynamic psychology. See, for example, J. McV. Hunt (ed.), *Personality and the Behavior Disorders* (Vol. II; New York; The Ronald Press Company, 1944).

impossible, high standards of performance cannot be maintained, "sabotage" of the superior's efforts is almost inevitable. Resistance, antagonism, and ultimately open rebellion are the consequences.

**The Conditions of Security: Knowledge.** The second requirement for the subordinate's security is knowledge. He must know what is expected of him. Otherwise he may, through errors of commission or omission, interfere with the satisfaction of his own needs. There are several kinds of knowledge which the subordinate requires:

1. Knowledge of over-all company policy and management philosophy. Security is impossible in a world of shifting foundations. This fact was convincingly demonstrated—to management in particular—during the first few months of the existence of the War Labor Board. The cry for a national labor policy was frequently heard. "Without it we don't know how to act." Likewise, subordinates in the individual company require a knowledge of the broad policy and philosophy of top management.<sup>11</sup>

2. Knowledge of procedures, rules and regulations. Without this knowledge, the subordinate can only learn by trial and error, and the threat of punishment because of innocent infractions hangs always over his head.<sup>12</sup>

3. Knowledge of the requirements of the subordinate's own job; his duties, responsibilities, and place in the organization. It is surprising how often subordinates (particularly within the management organization) are unable to obtain this essential knowledge. Lacking it, one can never be sure when to make a decision, or when to refer the matter to someone else; when to act or when to "pass the buck."<sup>13</sup> The potential dangers in this kind of insecurity are apparent upon the most casual consideration.

4. Knowledge of the personal peculiarities of the subordinate's immediate superior. The good salesman never approaches a new prospect without learning all he can about his interests, habits, prejudices, and opinions. The subordinate must sell himself to his superior, and consequently such knowledge is indispensable to him. Does the boss demand initiative and originality, or does he want to make all the decisions himself? What are the unpardonable sins, the things this superior never forgives or forgets? What are his soft spots, and what are his blind spots? There can be no security for the subordinate until he has discovered the answers to these questions.

5. Knowledge by the subordinate of the superior's opinion of his performance. Where do I stand? How am I doing? To know where you stand in the eyes of

<sup>11</sup> A few employee "handbooks" demonstrate an awareness of this point. See for example, *Employe Relations in General Foods* (2d ed.; New York: General Foods Corporation, 1941).

<sup>12</sup> This is the usually recognized reason for the publication of employee handbooks. Cf. Alexander R. Heron, *Sharing Information with Employees* (Stanford University: Stanford University Press, 1942).

<sup>13</sup> Donaldson Brown, "Industrial Management as a National Resource." *The Conference Board Management Record*, 1943, V, 142-148.

your superiors is to know what you must do in order to satisfy your needs.<sup>14</sup> Lacking this knowledge, the subordinate can have, at best, only a false sense of security.

6. Advance knowledge of changes that may affect the subordinate. Resistance to change is a common phenomenon among employees in industry.<sup>15, 16, 17</sup> One of the fundamental reasons is the effect of unpredictable changes upon security. If the subordinate knows that he will always be given adequate warning of changes, and an understanding of the reasons for them, he does not fear them half so much. Conversely, the normal inertia of human habits is tremendously reinforced when one must be forever prepared against unforeseen changes in policy, rules, methods of work, or even in the continuity of employment and wages.

It is not necessary to turn to industry for evidence in support of the principles outlined above. Everywhere in our world today we see the consequences of the insecurity caused by our inability to know what we need to know in order to insure even partially the satisfaction of our needs. Knowledge is power, primarily because it decreases dependence upon the unknown and unpredictable.

**The Conditions of Security: Consistent Discipline.** The third requirement for the subordinate's security in his relationship of dependence on his superiors is that consistent discipline may take the form of positive support for "right" actions as well as criticism and punishment for "wrong" ones. The subordinate, in order to be secure, requires consistent discipline in both senses.<sup>18</sup>

He requires first of all the strong and willing backing of his superiors for those actions which are in accord with what is expected of him. There is much talk among some managements about superiors who fail to "back up" their subordinates. The insecurity that arises when a subordinate does not know under what conditions he will be backed up leads him to "keep his neck pulled in" at all times. Buck-passing and its consequent frictions and resentment are inevitable under such circumstances.

Given a clear knowledge of what is expected of him, the subordinate requires in addition the definite assurance that he will have the unqualified support of his superiors so long as his actions are consistent with those policies and are taken within the limits of his responsibility. Only then can he have the security and confidence that will enable him to do his job well.

<sup>14</sup> This, of course, is the reason for merit rating plans. Cf. National Industrial Conference Board, Inc., *Employee Rating. Methods of Appraising Ability, Efficiency and Potentialities (Studies in Personnel Policy No. 39)*, New York: N.I.C.B., 1941).

<sup>15</sup> F. J. Roethlisberger and W. J. Dickson, *loc. cit.*

<sup>16</sup> Douglas McGregor and Irving Knickerbocker, "Industrial Relations and National Defense: A Challenge to Management." *Personnel*, 1941, XVIII, 49-63.

<sup>17</sup> Sumner H. Slichter, *loc. cit.* Chaps. VII-IX.

<sup>18</sup> This, of course, is simply the well-known principle underlying all theories of learning. We need not discuss here its many complicated features.

At the same time the subordinate must know that failure to live up to his responsibilities, or to observe the rules which are established, will result in punishment. Every individual has many wants which conflict with the demands of his job. If he knows that breaking the rules to satisfy these wants will almost inevitably result in the frustration of his vital long-range needs, self-discipline will be less difficult. If, on the other hand, discipline is inconsistent and uncertain, he may be unnecessarily denying himself satisfaction by obeying the rules. The insecurity, born of uncertainty and of guilt, which is inevitably a consequence of lax discipline, is unpleasant and painful for the subordinate.

What frequently happens is this. The superior, in trying to be a "good fellow," fails to maintain discipline and to obtain the standards of performance which are necessary. His subordinates—human beings striving to satisfy their needs—"take advantage of the situation." The superior then begins to disapprove of his subordinates (in spite of the fact that he is to blame for their behavior). Perhaps he "cracks down" on them, perhaps he simply grows more and more critical and disapproving. In either event, because he has failed to establish consistent discipline in an atmosphere of genuine approval, they are threatened. The combination of guilt and insecurity on the part of the subordinates leads easily to antagonism, and therefore, to further actions of which the superior disapproves. Thus a vicious circle of disapproval—antagonistic acts—more disapproval—more antagonistic acts is set up. In the end it becomes extremely difficult to remedy a situation of this kind because both superior and subordinates have a chip-on-the-shoulder attitude which must be abolished before the relationship can improve.

Every subordinate, then, requires the security of knowing that he can count on the firm support of his superiors for doing what is "right," and firm pressure (even punishment) to prevent his doing what is "wrong." But this discipline must be established and maintained in an atmosphere of approval. Otherwise, the subordinate's suspicion and resentment of his superiors will lead to the opposite reaction from the desired one. A mild degree of discipline is sufficient in an atmosphere of approval; even the most severe discipline will in the end be unsuccessful in an atmosphere of disapproval. The behavior of the people in the occupied countries of Europe today provides a convincing demonstration of this psychological principle.

**The Necessity for Independence.** When the subordinate has achieved a reasonable degree of genuine security in his relationship to his superiors, he will begin to seek ways of utilizing more fully his capacities and skills, of achieving through his own efforts a larger degree of satisfaction from his work. Given security, the subordinate seeks to develop himself. This active search for independence is constructive and healthy. It is collaborative and friendly, yet genuinely self-assertive.

If, on the other hand, the subordinate feels that his dependence on his

superiors is extreme, and if he lacks security,<sup>19</sup> he will fight blindly for freedom. This reactive struggle for independence is founded on fear and hatred. It leads to friction and strife, and it tends to perpetuate itself because it interferes with the development of an atmosphere of approval which is essential to security.

These two fundamentally opposite ways in which subordinates seek to acquire independence have entirely different consequences. Since we are concerned with the conditions of the successful subordinate-superior relationship, we shall emphasize the active rather than the reactive striving for independence.<sup>20</sup>

**The Conditions of Active Independence: Participation.** One of the most important conditions of the subordinate's growth and development centers around his opportunities to express his ideas and to contribute his suggestions before his superiors take action on matters which involve him.<sup>21, 22</sup> Through participation of this kind he becomes more and more aware of his superiors' problems, and he obtains a genuine satisfaction in knowing that his opinions and ideas are given consideration in the search for solutions.<sup>23</sup>

Participation of this kind is fairly prevalent in the upper levels of industrial organizations. It is often entirely lacking further down the line. Some people insist that the proponents of participation at the lower levels of industry are unrealistic idealists. However, there are highly successful instances in existence of "consultative supervision,"<sup>24</sup> "multiple management,"<sup>25</sup> and "union-management cooperation."<sup>26</sup> The important point is that participation cannot

<sup>19</sup> It is the subordinate's own feelings and not the "objective" facts which are vital in this connection.

<sup>20</sup> A. H. Maslow. "The Authoritarian Character Structure," *J. Soc. Psychol.*, 1943, XVIII, 401-411.

<sup>21</sup> The work of Kurt Lewin and his students at the University of Iowa on group dynamics is relevant to this whole discussion, but it is especially pertinent to this matter of participation. Cf. K. Lewin, R. Lippitt, and S. K. Escalona, *Studies in Topological and Vector Psychology I* (*University of Iowa Studies in Child Welfare*, 1940, XVI, No. 3).

<sup>22</sup> Alex Bavelas, "Morale and the Training of Leaders," in Goodwin Watson (ed.), *Civilian Morale, Second Yearbook of the Society for the Psychological Study of Social Issues* (New York: Houghton Mifflin Co., 1942).

<sup>23</sup> The fear is often expressed that subordinates, given the slightest opportunity, will seek to usurp their superiors' "prerogatives." Actually, such attempts are symptomatic of the reactive struggle for independence. These fears are groundless when subordinates are given adequate security.

<sup>24</sup> H. H. Carey. "Consultative Supervision and Management," *Personnel*, 1942, XVIII, 286-295.

<sup>25</sup> Charles P. McCormick. *Multiple Management* (New York: Harper & Brothers, 1938).

<sup>26</sup> Clinton S. Golden and Harold J. Ruttenberg. *The Dynamics of Industrial Democracy* (New York: Harper & Bros., 1942).

be successful unless the conditions of security are adequately met. Many failures among the currently popular Labor-Management Production Drive Committees can be traced directly to this fundamental fact that active independence cannot be achieved in the absence of adequate security.<sup>27, 28</sup>

There is a real challenge and a deep satisfaction for the subordinate who is given the opportunity to aid in the solution of the difficult but fascinating problems that arise daily in any industrial organization. The superior who, having provided security for his subordinates, encourages them to accept this challenge and to strive with him to obtain this satisfaction, is almost invariably surprised at the fruitfulness of the results. The president of one company remarked, after a few management conferences designed to encourage this kind of participation, that he had never before realized in considering his problems how many alternative possibilities were available, nor how inadequate had been the knowledge upon which he based his decisions. Contrary to the usual opinion, this discovery is as likely at the bottom of an organization as at the top, once the initial feelings of inadequacy and hesitancy among workers are overcome.<sup>29</sup>

The genuine collaboration among all the members of an industrial organization which is eulogized by "impractical idealists" is actually quite possible. But it can only begin to emerge when the mechanisms of genuine participation become an established part of the organization routines.

**Conditions of Active Independence: Responsibility.** A corollary of the desire for participation is a desire for responsibility. It is another manifestation of the active search for independence. Insecure or rebellious subordinates—seeking independence in the reactive sense—do not accept responsibility. They are seeking freedom, not the opportunity for self-realization and development.

The willingness to assume responsibility is a genuine maturational phenomenon. Just as children cannot grasp the meaning of the algebraic use of symbols until their intellectual development has reached a certain level so subordinates cannot accept responsibility until they have achieved a certain degree of emotional security in their relationship to their superiors. Then they want it. They accept it with obvious pleasure and pride. And if it is given to them gradually, so that they are not suddenly made insecure again by too great a load of it, they will continue to accept more and more.

The process of granting responsibility to subordinates is a delicate one. There are vast individual differences in tolerance for the inevitable pressures and insecurities attendant upon the acceptance of responsibility. Some sub-

<sup>27</sup> "Mill and Factory's Survey of the Labor-Management Production Drive." *Mill and Factory*, 1942, XXX, 57-60.

<sup>28</sup> "Are War Production Drives Worth While?" *Factory Management and Maintenance*, 1942, C, 74-80.

<sup>29</sup> Clinton S. Golden and Harold J. Ruttenberg, *loc. cit.* ch. 9.

ordinates seem to be content to achieve a high degree of security without independence. Others thrive on the risks and the dangers of being "on their own." However, there are few subordinates whose capabilities in this direction are fully realized. It is unwise to attribute the absence of a desire for responsibility to the individual's personality alone until one has made certain that his relationship to his superiors is genuinely secure.

Many superiors are themselves so insecure that they cannot run the risk of being responsible for their subordinates' mistakes. Often they are unconsciously afraid to have capable and developing subordinates. The delegation of responsibility, as well as its acceptance, requires a confident and secure relationship with one's superiors.<sup>30</sup>

**Conditions of Active Independence: the Right of Appeal.** There are occasions when subordinates differ radically but sincerely with their superiors on important questions. Unless the superior follows an "appeasement" policy (which in the end will cost him his subordinates' respect), there exists in such disagreement the possibility of an exaggerated feeling of dependence and helplessness in the minds of the subordinates. They disagree for reasons which seem to them sound; yet they must defer to the judgment of one person whom they know to be fallible.

If these occasions are too frequent, the subordinates will be blocked in their search for independence, and they may readily revert to a reactive struggle. The way out of the dilemma is to provide the subordinate with a mechanism for appealing his superior's decisions to a higher level of the organization. The subordinate can then have at hand a check upon the correctness and fairness of his superior's actions. His feeling of independence is thereby increased.

This is one of the justifications for an adequate grievance procedure for workers.<sup>31, 32</sup> All too often, however, there is no similar mechanism provided for members of management. To be sure, in the absence of a union it is difficult to safeguard the individual against retaliative measures by his immediate superior, but it is possible to guarantee a reasonable degree of protection.

If the relationship between subordinate and superior is a successful one, the right of appeal may rarely be exercised. Nevertheless, the awareness that it is there to be used when needed provides the subordinate with a feeling of independence which is not otherwise possible.

<sup>30</sup> Irving Knickerbocker and Douglas McGregor, "Union-Management Cooperation: A Psychological Analysis," *Personnel*, 1942, XIX, 530-533.

<sup>31</sup> Solomon Barkin, "Unions and Grievances," *Personnel Journal*, 1943, XXII, 38-48.

<sup>32</sup> United States Department of Labor, Division of Labor Standards, *Bulletin* No. 60, *Settling Plant Grievances* (Washington: Government Printing Office, 1943).

### SUMMARY

The subordinate in the industrial organization is dependent for the satisfaction of many of his vital needs upon the behavior and attitudes of his superiors. He requires, therefore, a feeling of confidence that he can satisfy his needs if he does what is expected of him. Given this security, he requires opportunities for self-realization and development.

Among the conditions influencing the subordinate's feelings of security are: (1) an "atmosphere" of approval, (2) knowledge of what is expected of him, and of how well he is measuring up to these expectations, (3) forewarning of changes that may affect him, and (4) consistent discipline both in the form of backing when he is "right" and in the form of punishment when he is "wrong."

The conditions under which the subordinate can realize his own potentialities include: (1) an adequate sense of security in relation to his superiors, (2) opportunities to participate in the solution of problems and in the discussion of actions which may affect him, (3) the opportunity to assume responsibility as he becomes ready for it, and (4) the right of appeal over the head of his immediate superior.

These conditions are minimal. Upon their fulfillment in some degree rests the success or failure of the subordinate-superior relationship at every level of the industrial organization from that of the vice-president to that of the worker.

## 2. What It Takes to Be a Good Executive

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*Editors of Modern Industry*

Reprinted from *Modern Industry*, August 15, 1949, by permission of the publisher. The facts revealed in this report are based on 20 years of study and practice in working with successful management men, by partners in the firm of Rohrer, Hibler & Replogle, psychological consultants to top management.

As the "professional" management man takes over the big jobs in industry, the quality called "executive ability" is growing more and more important—to the man himself as well as to his company.

It's no longer enough, in companies of more than a few employees, for a top executive to be a good inventor, a fast-stepping sales or financial genius, or a skilled engineer. Management is too much of a science, competition is

too stiff, and industrial change is too sudden and drastic for a company whose managers have only technical skills to last very long.

The one-man company is in an equally weak position. The management job today is simply too complicated for one man to have a hand in everything.

Companies that are getting the best results today are run by teams of top managers—presidents, vice presidents, the heads of important divisions—who are first of all good executives and administrators. Only a man with this high type of managerial skill can perform in a top-executive job and answer the challenge he faces: to get things done through people, to develop able subordinates, and to delegate to them responsibility for carrying out the policies that the top executive works out.

But just what is this managerial skill called executive ability? What are the working tools of a man who has it? What does he do and what does he avoid doing?

Twenty years of study and practice of top-management methods by Rohrer, Hibler & Replogle, psychological consultants to top management, reveal that men who are doing first-class executive jobs, as shown by their companies' and their own success, have these five basic qualities:

### Have This in Common

1. They are, of course, intellectually competent. They're intelligent. They have the mental equipment to think clearly and precisely about their company and its problems.
2. They are emotionally stable. They have learned to keep personal feelings out of business problems. They are steady as a rock in times of trouble.
3. They are skillful in human relations. They know that people do their best work under an approachable and considerate boss. They have learned the importance of keeping their juniors informed and of giving them the feeling that they "belong."
4. They have insight into human behavior. They understand what makes people tick, what their motives and ambitions are; and they know, as a result, how to lead, rather than drive, others into doing what the chief executive wants done.
5. They know how to organize and direct. They can delegate authority, and they enjoy keeping a dozen balls in the air at one time.

Though all good executives meet these tests, it is still true that no such thing as a "typical executive" exists, and a "best way" of doing things is a rarity. A good executive tries to be himself and to do things in the way that is natural for him. One builds enthusiasm in his men with a rousing pep talk, another does it with a quiet statement of facts. Both get results, because they are doing it their own way.

How far a man with these qualities actually goes and how good a job he does depends on how much of each quality he has, or can develop. Let's take a closer look at what makes up these qualities.

Decisiveness is a part of intellectual competence. Successful top executives have the mental guts to make decisions and make them stick. The boss who talks over his problems with his people and gets their angle on them is doing a lot to win their cooperation. But he can't rest on that, and he can't make them decide on the answer, as some do. He is the one to decide. If he doesn't, no one else will.

Experience has shown that just about the quickest way to build up tension and uncertainty in a subordinate is to put him under a man who can't make up his mind. One company headed by the inventor of its product is a classic case. As an inventor, he was brilliant because he could go at a single problem with great singleness of purpose. But because of that very fact, he was unable to see all the problems of his company as a comprehensive whole. So, in defense, he refused to make decisions himself, and he wouldn't let the people around him make decisions either. The result was foregone: The company went to the wall because the president didn't have it in him to be a president, and no able subordinate was allowed to step into the breach.

Men love to follow the decisions of superiors whose competence they respect. But decisiveness is not obstinacy or bullheadedness. It is based on sound judgments, which in turn are based on facts. And decisiveness is backed up by self-confidence, though this will be the quiet rather than the loud kind.

**Alive to Many Ideas.** Another part of intellectual competence is open-mindedness, and breadth of thinking and point of view. The able executive, especially the president, knows something about other branches of management besides the one he started in, and he knows what's going on in other companies and industries. His job is to understand the relationships between his company and competitors, and the effect that developments in other industries have on his. This requires a mind that can get up and out of the operating details of an organization.

Emotional stability, the second key quality of the able top executive, depends heavily on consistency.

To work effectively, people need to judge how their chief will react to different conditions. Consequently, one of his qualities is to act in a consistent pattern so his staff will know what to expect from him.

**Fitful Leader Gets Nowhere.** An executive who is flighty—who fires people one day and rehires them the next, who talks of big expansion plans one week and pinches pennies another—confuses his staff, lowers their morale, and fails to win their confidence. Wide gyrations of mood, manner, and act keep a management team in constant uproar, and make it impossible in fact to be a team. One cannot follow a leader unless he has a general idea of where the leader is going.

But consistency has to be right. The hard-boiled, tough-talking executive, trying to offset his feeling of insecurity by over-exerting his authority, may

be consistent; but he has as withering an effect on his men as the indecisive one.

So does the boss who affects nonchalance and boredom to convince himself he has no problems. If the boss can't be enthusiastic about the job to be done, no one else can. A man of one mood has a dulling effect on subordinates. The able sales manager knows very well that results are usually better when he alternately stimulates and eases up on his men. Salt in the form of varying moods is good as long as the executive pattern is basically the same.

Another element that goes into emotional stability is the desire to keep personal feelings out of company problems. Able top-management men try to keep logic from being warped by their feelings. They avoid emotional outbursts because they have learned that sooner or later these fireworks will develop blind spots, distort their thinking, and reduce their administrative effectiveness.

Skill in human relations, the third basic executive quality, includes one principle of outstanding importance: A top-executive's behavior is extremely contagious. He sets the style for a company even more than most people think. His employees watch him closely all the time. What he does, they do. What he doesn't do, it is all but impossible for them to do.

If the head of an organization is tough with his men, they will be tough with theirs—only more so. If he is open to suggestions, they will be, too. Whether he is autocratic or democratic, arbitrary or open-minded, makes hasty, vague decisions or firm, well-thought-out ones, the people in his organization will follow the same line.

**Little or Big, It's Catching.** A manager can lead his organization to new heights in safe working by showing keen interest in the safety problems of his plant. If the rule is to wear safety glasses in his plant, he must above all others wear them. A cost-minded president can, by contagious example, arouse the same concern in everyone in his organization. A man who shows consideration for others can greatly improve human relations throughout his company.

There is the case, for instance, of the president who succeeded his father as head of the business. Neither had ever called even their closest associates by their first names. It was always "Mister." As a natural result, the atmosphere all through the company was frigid. Then one day it was suggested to him that maybe things would go more smoothly if something could be done to warm up the personal relations in the company. As a first step, the president, it was hinted, might try using first names with his vice-presidents.

It was a big break with company tradition, but the president went through with it. Then he followed it up with other changes. He started going out to lunch with his associates. He began to praise them for good work. These and other touches, he now admits, have made a great difference in the company

atmosphere—with a substantial boost in morale and in individual efficiency. For the change has filtered all the way down the ranks.

A little means a lot in improving human relations. The new president of one company, brought in from outside, attended an outdoor exhibit of its products; but before joining other executives in drinking coffee at the refreshment stand, he asked "Is there enough for the mechanics outside?" Word of this casual remark, spreading through the organization, stamped him as a man who believed in consideration for others. His people got the point.

Openness—as distinguished from bluntness on one side and insincerity on the other—is also a key to developing sound human relations, and thus good administrative operations. People like to know where they stand.

A company's employee-rating system is a good test of this quality—a test which one company didn't pass. Subordinates were systematically rated by their chiefs, but the results were never revealed and they never got a chance to talk them over with the boss. So they never knew what their weaknesses were considered to be, and had no chance to correct them.

**A Show-off Never Pays Off.** A common block on the road to good human relations is the temptation for the top man to show off his power and authority, and to inflate his own importance. When this happens, as men who have gone through it know, the boss loses touch with his people, and is no longer able to lead them. He is through as an effective manager.

A good top executive also has insight—the ability to understand behavior in one's self and others—as a fourth basic quality. On this knack of knowing why people act the way they do, rests largely an administrator's ability to develop his men and get the best results from them.

**"The Boss Wears Blinders."** Sensitiveness to people—simple awareness of others—is the key element in insight. Two out of three juniors say their boss doesn't have it.

This is largely a matter of seeing the other person's point of view, and understanding what his feelings, motives, and reactions are. Once an executive gets this understanding, he has grasped the best single tool there is for building an alert and able staff.

Each person has his own set of motives and reactions. Criticism spurs one man to greater effort. Another wilts under it, but responds amazingly to praise. But praise may only inflate a third; he coasts on the job as a result, where giving him some new goal to shoot at would make him plunge into his work with new energy. The importance of getting and using this information, which is available to anyone who is sensitive to people or can acquire the quality, can hardly be exaggerated.

There are deeper urges, too. If the top executive can sense that one of his men won't delegate authority because he feels insecure, he can show him that delegation actually strengthens his standing.

One company's branch managers at first struck a new president as stubborn

empire builders who took fiendish delight in bucking the home office. But when he began to develop an understanding of peoples' need to feel they "belong," he began to see that their cussedness was just a symptom. What was really wrong was the way the home office gave them arbitrary orders and made decisions affecting them without sitting down and talking things over. The branch managers reacted as normal human beings would; they felt both neglected and pushed around, and they showed their resentment by objecting to everything headquarters did.

**Didn't Take a Miracle.** Once the real reason became clear, the cure was simple—and effective: Now the president and his executive vice-president allot one fourth of their time to traveling to the branches for feet-on-the-desk talks with the managers. Sales are going up because the branch managers are digging in with new enthusiasm, and the field trips have given the top executives a real feel of the market.

Lack of sensitiveness to people shows up in many ways. Administrators state that a common sign of it is failure to give credit where credit is due. The effect on people is obvious if their chief takes all the glory for their work. Yet many do.

**Can't Be in a Hurry Here.** A deep pitfall is superficial insight: Associates are hastily classified as extroverts or introverts, and handled accordingly. But there are many varieties of each type, and some personalities just can't be card-indexed. The people-wise executive keeps up a constant study of those under him; consequently, he steadily increases his skill in handling them, with steady improvement in the results they get for him.

The fifth basic executive quality—ability to organize and direct—is made up mostly of ability to delegate.

Management authorities state that failure to delegate is the most common executive blind-spot of them all, and is a big problem even among successful administrators. It is the one reason why so many companies fall down on planning, and why so many will fold up when competition gets tough. Their top executives have had no time to plan.

**Some Afraid to Delegate.** The main reason for failure to delegate is a deep-seated and unrecognized fear within the executive himself. He lacks confidence in his ability to pick men he can fully trust; therefore, he has a compulsion to keep all the reins in his own hands. A relaxed, casual, matter-of-fact acceptance of oneself and one's own abilities is at the core of the personality of the executive who can delegate.

Great industrial waste is caused by the \$10,000-a-year executive who spends time doing such \$1,800 jobs as looking into \$2 expenditures, fussing with the files, and generally mixing into details that his company can't afford to have him involved in. (But the executive himself isn't always at fault; very often, his company won't give him enough \$35-a-week help.)

**What Top Brass Is Paid For.** The executive is paid to think, to plan, to organize, to initiate, and to execute. The pile of work on his desk or the hours he spends in the office mean nothing in his performance. His standard is the quality of the ideas he develops and of the results he gets through others.

When the administrator gets lost in the details, he can't do what he is paid to do. There are sales managers who like selling so well they never manage; works managers who prefer housekeeping to administration; and controllers whose thoughts are so concentrated on working things out to the fourth decimal point that million-dollar ideas pass them unseen.

But the company president who fails to delegate is an even more serious source of waste. When this happens, a whole company, not just a department, suffers.

The president who keeps his hand in operating details competes with his own men and thereby wrecks his organization. Self-respecting department heads will pull out; less self-respecting ones may hold on, but they will let the chief do the work. And then the chief will have no time for the thinking and planning that keep his company up with the parade. Corporate cemeteries are crowded with companies whose presidents were too busy to plan.

**Knows How to Train Men.** Important though it is, the knack of delegating is only one of several parts that add up to organizing and directing ability. The know-how of training his people is another—and here sensitiveness to people is a "must." To do a good training job, the executive must know how to develop responsibility in others, how fast a subordinate can absorb learning, and when he is ready to take on broader duties.

Finally, of course, the able executive is a leader. He tries not to follow the example of the president of a million-dollar company who follows out the "I'm the boss" attitude to the limit.

This man, whose company obviously would be more successful if he changed his executive methods, has his office at the end of the hall where he can see the comings and goings of other executives. All mail addressed to them goes to his office; he sorts it and reads it, then goes from office to office down the hall criticizing the activities and decisions the letters reveal, while the people on his staff wait in nervous excitement for his arrival and wilt after he leaves.

**No Shoving Allowed.** In contrast, the capable administrator is careful to avoid any trace of dictatorship, or of pushing people around. He seldom gives orders. He "sells" people, so they want to do what he wishes. The people under him know what his goals and methods are, and they jump to the oars, at a suggestion. He is out in front leading, not pushing from the rear.

All successful managers have these five basic qualities to some extent, whether they are at the top or only part way up. But one characteristic

is found only in the president of a company: His sense of the difference between his job and any other in the outfit. He guides his conduct accordingly.

**Alone, at the Top.** The chief executive's job is unique in two ways: In its isolation and in the way he works. The president of any company, and in large firms a very few top divisional heads, must be able to live alone and like it. The chief executive is at the top of a pyramid. No one else is on his level. He must be friendly with the executives who are under him. But he can't confide in them. If he confides in one, he is playing favorites, which is bad; and he obviously can't confide in all.

The chief executive works in a different way from other executives, too. En route to the top, he won promotions by being competitive—by outdoing other executives in solving sales, engineering, production, or other problems in his special field. But when he becomes president, he crosses a Continental Divide.

**Out of Competition.** Ninety per cent of his work is now on personal and human problems. His job is to get things done through others. He must be cooperative instead of competitive; he must unlearn the very competitive habits which previously brought him success. His assignment now is to help the other members of his group reconcile their competitive ambitions and work together as a team. And the chief executive's success comes through the man under him, instead of directly through the technical problems he himself solves.

For the same reason, the president must get his satisfaction and sense of achievement from new directions. As sales manager, he could see such tangible results of his work as increased sales; or as production manager he could see output rising or costs going down. But as chief executive, he now gets tangible results only by means of others. It is much more difficult for him to evaluate his own success.

He used to carry the ball; now he is on the sidelines as coach. And just as with a coach, one of the tough problems of a president is to get personal satisfaction from the efforts of the people under him. He needs to learn to get the same sense of accomplishment from developing an able assistant that he once got from a 20% boost in sales or the design of a new materials-handling system.

**Qualities Can Be Acquired.** To some extent, the qualities of a good top executive are born in the man. But to a substantial degree they can be acquired. Intelligence may be inborn, but training and self-discipline can offset some lack of it. Many a top executive has converted himself from a frigid martinet into a leader whom others love to follow, simply by putting the time and effort into solving the problem that its importance deserves.

A man's inner personality can't perhaps be changed. But his external presence can be, and so can his methods of handling people. If a plant man-

ager remakes his production setup because it isn't as profitable as it should be, it is logical for the chief executive to restudy the way he handles people and make what changes are needed to get better results.

There is no one formula for good administration. But certain signs can be watched for in judging whether an executive's methods are open for improvement. Among them are:

1. Making snap judgments. Heavy pressure of work is one cause. But this, in turn, often comes from lack of planning and poor anticipation of coming problems. One executive, with a habit of making snap decisions, was advised by his counselor to hold off 24 hours in deciding on six problems which his men placed before him that day. The next day he greeted the counselor with a grin. "If I'd answered right away," he admitted, "I would have been wrong on three of them. And as for the other three, no answer was really needed. The problems have evaporated already."

2. Riding roughshod over people. The results from people are a small fraction of what they could be with considerate handling—and the executive usually ends up by doing the whole job himself. No one who uses this method can effectively get things done through people. Yet this is the main function of the administrator.

3. Always up against emergencies. Problems are on top of the executive before he sees them. The cause is lack of time to look ahead, largely a result of not delegating.

4. Harassed by details. They swamp the administrator, prevent him from thinking ahead. Again, the cause is failure to delegate, which comes from inadequate help for the executive or unwillingness to leave details to others.

5. Subordinates leaving the company. When they do this in numbers, it means they see no future there. Usual causes are the other failings listed here—hasty decisions, riding roughshod over people, failing to give subordinates the responsibility they've earned, and the rest.

6. Several executive assistants reporting to one administrator. Chances are he's spending so much time keeping them busy that he hasn't time to plan or to sit down with his department heads.

7. Two or more phones and an office communication system on the desk. If he needs all these to do his work, the administrator is too deep in detail for leisurely thinking and long-range planning.

8. Desk piled high with work. He is always just about to catch up, but never quite does. Again, a symptom of failure to delegate.

No one knows better than the good executive how easy it is to drop into these pitfalls. Most of them have done it at one time or another. What has put them back on the road is realization that they are doing their job well only if they get the most effective work out of their people; and that this is an executive ability that can be acquired and constantly improved if the time and effort it deserves are put into it.

### 3. Leadership: A Conception and Some Implications

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*Irving Knickerbocker*

Reprinted from the *Journal of Social Issues*, 1948, Vol. 4, No. 3, 23-40, by permission of the author and The Society for the Psychological Study of Social Issues. It is the author's thesis that a leader in any situation emerges as a consequence of the needs of a group of people and of the nature of the situation within which the group is attempting to operate. The applicability of this general concept to industrial leadership is discussed.

During several years of working with the problems of human relations which arise in organizations of people, my colleagues and I have sought a satisfactory conceptualization of the phenomena of leadership. We have gradually crystallized some ideas which have been helpful both theoretically and practically. However, a recent survey of the literature on leadership suggests that we have wandered from the paths customarily followed by students of the subject.

Motivated by the conviction that some systematic frame of reference, however rough, is better than none, we offer the following analysis of leadership for what it may suggest to those who are interested. While these are in part speculative considerations, they have been tested for usefulness through some years of practice.

Much of the literature on leadership represents an attempt to study the leader as an entity possessed of characteristic traits and occupying rather inertly a status position relative to other individuals who are not too clearly related to him.<sup>1</sup> Actually, the leader emerges as a consequence of the needs of a group of people and of the nature of the situation within which that group is attempting to operate. Stogdill,<sup>2</sup> after an exhaustive survey of the literature, concludes that "leadership is not a matter of passive status, or of the mere possession of some combination of traits. It appears rather to be a working relationship among members of a group, in which the leader acquires status through active participation and demonstration of his capacity for carrying cooperative tasks through to completion."

<sup>1</sup> A notable exception is *Functions of the Executive* by Chester Barnard, Cambridge, Mass., Harvard University Press, 1938.

<sup>2</sup> Stogdill, Ralph M., "Personal Factors Associated with Leadership: A Survey of the Literature," *Journal of Psychology*, 1948, Vol. 25, 35-71.

Jenkins,<sup>3</sup> reviewing the literature dealing with the problem of the selection of leaders in various fields, finds that "The situation does not appear to be a particularly happy one with regard to the deriving of general principles or of setting up a systematic theory of leadership from the available information. A few statements may be set forth, however, that appear to hold for the findings of a number of the investigations reviewed; this list should be thought of as a series of hypotheses for further investigation." His first statement is as follows: "1. Leadership is specific to the particular situation under investigation. Who becomes the leader of a given group engaging in a particular activity and what leadership characteristics are, in a given case are a function of the specific situation including the measuring instruments employed. Related to this conclusion is the general finding of wide variations in the characteristics of individuals who become leaders in similar situations, and even greater divergence in leadership behavior in different situations."

These authors, and a few others, have apparently recognized some of the inadequacies of the literature of leadership and of traditional research approaches to the subject. However, we are left standing on the threshold of a house which has not yet been erected. It is the purpose of this article to draw a tentative architect's sketch of the house which is so badly needed.

Although the evidence does not support the romantic conception of the leader endowed with magic attributes, this conception is widely held. One wonders why it persists with such vitality. Perhaps the fact that each of us commenced his life under the guidance of a leader—a big man, of tremendous endowment, with almost limitless power—would help to explain the prevalence and tenacity with which this Leader concept is held.

Each of us had a father, a prestige figure, magically endowed. Many of us found security in that figure. Since we continue to need security, perhaps we continue to carry with us out of childhood the father symbol, the Leader. If such an assumption may be accepted, then we can readily see that the leader, or the man whom we conceptualize as a leader, should be larger, more intelligent, more mature, more cultured, more impressive than we.<sup>4</sup>

Individuals so endowed relative to the group with which they are associated would statistically be seen more often as potential leaders and statistically be placed more often in a position where they might practice leadership, and finally, might statistically more often become leaders. All this could happen frequently enough to give us the feeling that leaders somehow are different and permit us to make the misleading research finding that the leader is an entity who can be considered apart from his functional relationship to his followers.

<sup>3</sup> Jenkins, William O., "A Review of Leadership Studies with Particular Reference to Military Problems." *Psychological Bulletin*, 1947, Vol. 44, No. 1, 75.

<sup>4</sup> Stogdill, *op. cit.*

Following our assumptions further, we should not be surprised to find that men who have achieved through function a position of leadership have usually possessed many of the mythical attributes of the leader. They serve as ink blots onto which people project their desires for security and dependence. To be sure, the degree of such endowment may be expected to vary with the closeness of the association between leader and followers. It is more difficult for their immediate associates to see them as leaders magically endowed. A consideration of Hitler and Roosevelt as seen by remote followers and immediate associates may lend some reality to this hypothesis.

It is interesting to speculate upon the possibility of the leader created by concerted action through various media of publicity in the absence of any true functional relationship between leader and followers. It doesn't seem impossible that such a leader might exist as an entity devoid of functional followers, but becoming for people the symbol, Leader. Certainly for most people the great leaders of history have been only a symbol. Any functional relationship between the people and the leader has been remote, if it existed at all. Yet the leader in each case has arisen through performing certain functions relative to some group somewhere, sometime. It would be interesting to compare the attitudes toward the leader of individuals from two groups, one composed of those functionally related to him as leader, the other composed of those for whom he existed as the symbol, Leader. From the historical literature there would appear to be sharp differences between the man and leader to his functional followers and the same Leader to those people who were not functionally related to him.

There is no reason to assume that the two concepts, Leader and functional leadership, may not be fused in many cases. Certainly the former would appear to grow out of the latter. If people are in search of the former, some of them at least may try to see in each functional leader, a Leader. It would appear that those leaders with sufficient sense of the dramatic to lend themselves readily to conforming to the outward appearance of being a Leader may more readily become one. Lincoln was rather a disappointment to many people in this respect. Hitler and Mussolini took to the role more readily. The functional leader always earns respect and prestige to the extent that he fulfils his function, but immediate contact is apt to inhibit the growth of the extremes of the Leader concept. Hence the many cynical proverbs concerning the prophet in his own country.

It would appear then that the usual notion of the leader serves to cover two quite separate concepts.<sup>5</sup> The first is an emotionally held conviction that some men are Leaders and as such are set apart from the common horde. These Leaders do not owe their position to their functional relationship to

<sup>5</sup> Van Dusen, A. C., "Measuring Leadership Ability," *Personnel Psychology*, 1948, Vol. 1, p. 68.

followers, but to an almost magical aura which surrounds them. They have god-like attributes which they have not earned but rather with which they have been endowed.

Our hypothesis is that this concept arises in our culture out of the relationship of the very young child with his father. An examination of the leader concept in other cultures or an analysis of differences between leader concepts among male and female in our own culture should help test this hypothesis. If the hypothesis be granted, then the statistical appearance of certain traits ascribed to the Leader, and the statistical appearance of leaders with these traits is not surprising. Nor is it surprising that experimentally devised but functional tests of leaders do not bear out the coincidence of the specific traits and the function of leadership.

The other concept—functional leadership—places emphasis not on a fixed set of personal characteristics nor on particular kinds of leadership behavior, but upon the circumstances under which groups of people integrate and organize their activities toward objectives, and upon the way in which that integration and organization is achieved. Thus the leadership function is analyzed and understood in terms of a dynamic relationship. A leader may acquire followers, or a group of people may create a leader, but the significant aspects of the process can only be understood in dynamic relationship terms. Evidence and speculation to date make it appear that this functional or operational conception of leadership provides the more useful approach.<sup>6</sup>

We need some schema which will emphasize this relationship between leader and led as a dynamic pattern. As an aid to thinking about such relationships, we have developed the following simple schema:<sup>7</sup>

1. *Existence for each individual may be seen as a continual struggle to satisfy needs, relieve tensions, maintain an equilibrium.*

Each of us uses many different means for the satisfaction of his needs. We use muscular skills, personal appearance, intelligence, knowledge. We use tools, food, money. The means we habitually use may become needs themselves. In each specific case, however, some means is used for the satisfaction of a need or of a pattern of needs.

<sup>6</sup> Tead, Ordway, *The Art of Leadership*, New York, McGraw-Hill Book Company, Inc., 1935, p. 20, p. 61.

Jenkins, *op. cit.*

Stogdill, *op. cit.*

Whitehead, T. N., *Leadership in a Free Society*, Cambridge, Mass., Harvard University Press, 1936, p. 68.

Stogdill, R. M., and Shartle, C. L., "Methods for Determining Patterns of Leadership Behavior in Relation to Organization Structure and Objectives," *Journal of Applied Psychology*, 1948, Vol. 32, No. 3, 286-291.

<sup>7</sup> In the interests of brevity, only three of a half dozen or more interrelated generalizations are here mentioned. . . .

*2. Most needs in our culture are satisfied through relationships with other individuals or groups of individuals.*

This assumption points up the fact that people and our relationship with people constitute the means upon which we rely most heavily for the satisfaction of our needs. Other people as it were possess the means which we would use to satisfy our needs. We do not grow our own food, make our own clothes, provide our own transportation, educate ourselves, or even provide our own recreation. We satisfy such needs, and many others, through means controlled and provided by others. When we are lonely, another person appears to us as means and controls in a sense the means we would like to use. When we are insecure, a closer relationship with someone is the means we seek and that someone controls the means. Often another person may possess the means in the form of money, skill, knowledge, or tools which we need as means for the satisfaction of our needs. We attempt then to establish a relationship which will be a means to gain the use of something which in turn will be a means to need satisfaction. To the manager the worker possesses the means of skill or hands. Through relationship with the worker as means, the manager hopes to obtain the further means he requires to satisfy his needs. To the worker, the manager controls the means of job and pay. So all of us seek through relationships with others the means, or the means to the means, for satisfying needs.

*3. For any individual the process of employing his relationship with other individuals as means for the satisfaction of his needs is an active rather than a passive process.*

He does not wait passively for the occurrence of such relationships as will provide means for need satisfactions. He institutes appropriate relationships or utilizes those which already exist toward the end of satisfying his needs. The relationship is thus an active, striving one, through which each party is operating to augment his means for need satisfaction (or to protect the means already at hand). Since each individual possesses some quantum of means small or large which some other individual might utilize for need satisfaction, each individual through his control of those means has some bargaining power relative to others. The control of means ("scarce means," the economists call them), which others desire for the satisfaction of needs, constitutes what we ordinarily call power. The use of power (or "means control") to gain the means for need satisfaction from others appears to be the essential aspect of all human relationships. The individual who controls many or scarce means which other people seek to utilize for need satisfaction is in a position of power. Such power may be used by an individual either to reduce the means of other individuals (punishment), or to augment their means (reward) toward the ultimate end of inducing these other individuals to provide him with means for the satisfaction of his own needs.

This approach furnishes us with the bare essentials of a schema for con-

sidering the dynamic aspect of the relationship between people. That relationship appears to consist essentially in an active striving to procure through other people the means for need satisfaction. The relationship is of course bilateral, each party seeking means through the other. We should expect an individual to attempt to establish a relationship only when it appears to promise means and to maintain it only so long as it continues to do so. We might also predict that the greatest number of individuals would attempt to establish a relationship with that individual who in their perceptual field gave greatest promise of providing means.<sup>8</sup> Finally, we might predict that individuals would attempt to break off relationships with and avoid those individuals who threaten to reduce their means, and if they could not do so would react protectively and possibly aggressively.

Let us consider a group of people including one who would be designated by the others as the leader if we asked. Let us make a general application of our schema to such a situation. We have a leader attempting to find a means through the activities of the group members for the satisfaction of his needs. At the same time the group members are in the relationship with him simply because he appears to them the best means available for the satisfaction of such of their needs as can be satisfied through this group.

Let us ask some questions concerning the individuals in the group.

### *Question 1*

Why are the individuals in the group?

Because through it or through the leader they anticipate finding means for satisfying needs (or means for protecting themselves against a threatened loss of need satisfaction). If we run over groups that we know well; such as a labor union, a church, a business association, a social club, etc., we seem to find that we joined such groups because they appeared to offer means. We leave them when they no longer seem to do so.

### *Question 2*

Why do the individuals accept direction of their activities?

Because this behavior appears to them to provide means for the satisfaction of their needs. The leader is seen as a means; through the relationship with him, needs are satisfied (or a reduction in need satisfaction is prevented). The leader may promise a chicken in every pot, a glorious future, or more money for less work. If the group member sees satisfaction of needs in the direction the leader indicates, if he believes the leader will serve as a means for getting those satisfactions, the group member follows. On the other hand, the leader may say "follow me, or disaster may befall you," "follow me, or

<sup>8</sup> Jennings, H. H., in *Readings in Social Psychology* (ed. Newcomb & Hartley), New York, Henry Holt and Company, 1947, 412.

I'll see to it that you rue the day you refuse," "follow me or else. . . ." Again, if the group member believes that the leader controls the relevant means, if the group sees a threat to his available means in failing to go in the directions the leader indicates, the group member follows. The individual then is related to the leader as a means to need satisfaction or as a means to protect available means from reduction. He follows and permits his activities to be directed because he believes that to do so will get him what he wants.

### *Question 3*

Why does the leader arise?

Even in the simplest situation, such as when a group embarks on discussion which will eventuate in a decision of some sort, a leader seems to be essential. Operationally, it is difficult for a group to speak or act except through an individual member. If everyone talks at once, no one can hear or attend. If everyone plans at once, or acts at once without a plan, there is no group but rather a collection of individuals planning or acting. For the group to act as a unit or to show organization, it is necessary that individual members speak for it. The necessity for an ordering of discussion is readily apparent as a means to a group. Such ordering must come through the action of an individual. Someone must verbalize the necessity for order, the methods of ordering, the final agreement on methods, and the agent. Some individual must order and in doing so he provides simple but necessary means for the group. Even at this very simple level, the necessity for a leader is real and apparent to most groups. To the extent that the objectives of the group require greater diversity of effort and greater coordination, the need for a leader will increase.

Now let us look at the leader and ask some questions about his behavior. Let us again answer the questions in terms of our frame of reference and examine the answers for the sense they make.

### *Question 4*

How is the leader to be characterized?

The leader is not a disembodied entity endowed with unique characteristics. He is the leader of a group and is the leader only in terms of his functional relationship to the group. Therefore the part he plays in the total dynamic pattern of the behavior of the group defines him as leader. He is a leader not because he is intelligent, skillful or original, but because his intelligence, skill or originality is seen as a means by the group members. He is a leader not because he is relatively imposing of stature, well-dressed, fluent of speech, or from a higher socio-economic background, but because these factors tend to predispose group members to expect better means from their possessor.

The leader is followed because he promises to get, or actually gets his

followers more nearly what they want than anyone else. If he does so, he will be followed be he small, insignificant looking and relatively speechless. In our culture we have some predisposition to expect people with certain characteristics to provide better means. Also certain characteristics such as intelligence may by and large in fact enable certain individuals to provide better means. However, the leader is a product not of his characteristics, but of his functional relationship to specific individuals in a specific situation. As a result, the variability of leaders' characteristics upsets all but the broadest statistical efforts at analysis.

### *Question 5*

How does the leader arise?

The leader appears to arise in one of two ways. First, as a result of agreement among members of a group that some individual serves as better means than any other. Such agreement may be wholly predictive, a matter of guess-work, or may be the result of experience among various members. The agreement of the members of a group may be verbalized or tacit. The member of a group who suggests "let's go get a cup of coffee" may collect a following and for a minute or so be a leader simply because he has voiced at an instant an operation which appears as a means to other members. The member of a group who is known to possess some special skill which is at the moment a necessity may be turned to and be expected to function as a leader because of his possession. In our culture it is not unusual for any group to make it first a business to choose a leader.

The second way in which a leader may arise is as a result of objectives which require a group of people for their achievement. An individual, for example, wants to accomplish something which can only be accomplished if he can direct the activities of a number of other people. He seeks then to find a group, or an assortment of individuals, who will accept his direction of their activities. If our basic assumptions above are correct, he will acquire "followers" only if, in their eyes, following him promises to result in increased need satisfaction (or in avoidance of reduction of need satisfaction).

### *Question 6*

Why does the leader lead?

Through leading, the leader obtains means of satisfying his needs. Perhaps the prestige and recognition accorded the leader are important sources of satisfaction. Or, to take the most obvious aspect, perhaps the result of the activities he directs is itself the means he seeks.

Consider, for example, the industrial manager. He may obtain satisfaction from his leadership role in a variety of ways. He may obtain satisfaction simply from being "the boss," from being able to tell people what to do, to control their activities and their satisfactions. He may find satisfaction, in

being regarded as their benefactor, in their gratitude for his favors, or their fear of his punishments. He may enjoy the way he is treated by those outside the organization who are impressed with his title and position. Finally, he may obtain a higher salary, promotion, and recognition from the achievements of the group whose activities he directs.

The motivation of the individual certainly plays a part in the likelihood of his leading. Many adults seem to dislike to lead. Others lead occasionally when, by reason of some special skill or knowledge they possess, it seems to them or to the group reasonable that they should do so. Some lead when only through the concerted activities of a group of people can they find a means to some need satisfaction. Still others enjoy leading. The actual operation of leading is a means to need satisfaction for them. Such individuals are apt to seek situations in which whatever means they have will be in demand. They attempt to acquire the skills which will be means, and a manner which will indicate their possession of means. If there are "born leaders," they arise from this group. Due to the many objectives in our culture which can only be achieved through group effort, many organizations arise. A great many people find leading—that is the job of a superior in an organization—to be the means through which they satisfy important needs.

### *Question 7*

#### **What is the function of the leader?**

The function of the leader is to organize the activities of the members of the group toward the accomplishment of some end through controlling means for the satisfaction of the relevant needs of the members of the group. When the leader has been chosen by a group of people who have decided upon an objective to be attained, the leader's function is obvious and his job is relatively simple. When the leader, however, is not chosen by the group, but appointed and given means of control by someone outside the group, or appoints himself because he requires a group to achieve his purposes, (as in business or military organizations), his job is considerably more difficult. In such circumstances the objective to be attained through the activities of the group is the objective of those who appointed him leader. This may not be the objective of the group he is to lead. Nevertheless, he must appear to the people he is to lead as a means for their need satisfaction or they will not accept his direction.

Sometimes, as a consequence, the appointed leader is an individual who would never have been chosen by the group he leads, but one who cannot be rejected because he controls important means for need satisfaction. He is "accepted" as the lesser evil. He appears to the group as a means only in the negative sense. Nevertheless, even in such extreme cases, the leadership function remains the same.

**Question 8**

Can all of the various kinds of leaders be accounted for by this same frame of reference?

The term leader is certainly used to designate many different positions and functions. It may be used to indicate a figurehead, a position in an organization, a self-appointed dictator possessed of sufficient "or else" power to force a following, or an individual who has been designated as leader by voluntary action of the group. To cut through the diverse usage which has been made of the term leader, we might say that to the extent that any individual succeeds in collecting an actual following, he does so because he controls means. The dictator may be followed because he has created or made use of a situation in which all alternatives to following him are less desirable as means. The superior in the formal organization, for instance in industry, may often occupy a position similar to that of dictator without being particularly aware of it. The man who can control means available to other people can use his control to force that alternative behavior which appears a better means within the restricted choice although a worse one within a larger but forbidden frame of reference. To the extent that the means controlled are scarce means, to that extent the possibility of limiting alternatives as a means of control is possible. The leader chosen by voluntary action of a group is seen as the best means rather than the lesser evil. But all leaders, whatever their personal objectives, must serve as means for their followers, or they will not be leaders (*i.e.*, they will have no followers).

Our conclusions from the above discussion of the nature of leadership may be summarized as follows:

1. The symbolic or romantic conception of the Leader, although widely prevalent, does not explain the phenomena of leadership. It exists, I have suggested, as a consequence of the nature of the individual's relationship with his father in early childhood. It represents a magical, perhaps wishful, attempt to find security through surrogate relationships resembling that early one. The leader, realistically and factually, is not a person endowed with a list of characteristics which make him what he is.
2. When conceived in terms of the dynamics of human social behavior, leadership is a function of needs existing in a given situation, and consists of a relationship between an individual and a group.
3. The functional relationship which is leadership exists when a leader is perceived by a group as controlling means for the satisfaction of their needs. Following him may be seen either as a means to increased need satisfaction or as a means to prevent decreased need satisfaction.
4. The leader may "emerge" as a means to the achievement of objectives desired by a group. He may be selected, elected, or spontaneously accepted by the group because he possesses or controls means (skill, knowledge, money, as-

sociations, property, etc.) which the group desires to utilize to attain their objectives—to obtain increased need satisfaction.

5. On the other hand, the leader may appoint himself or be appointed by someone outside the group to be led. In this instance leadership is a means to the achievement of the leader's objectives (or the objectives of those who appoint him). However, there will be no relationship with the group—no followers—except in terms of the leader's control of means for the satisfaction of the needs of the followers. Either the leader's objectives must also be those of the group (and he himself be seen by the group as a means to their attainment), or else accepting the leader's direction must be seen by the group members as the best available means to prevent reduced need satisfaction.

In business and industry, the leader is of the "appointed" (sometimes "self-appointed") kind. The members of management are not selected by the group they are to lead, but are appointed by those higher in management (or by owners) to achieve the objectives for which the business was created. There are some very special problems faced by the leader in such a situation, as will be apparent from the discussion above. It is my purpose to examine this kind of leadership in industry in more detail in the following pages.

The group of people comprising an industrial organization is not a group which has arisen to achieve an objective common to all its members. The owners, or the managers, have recruited a number of isolated individuals—created a group—because the combined efforts of many people are required to achieve the owner's objectives.

People become members of an industrial organization, and accept direction of their activities by the manager-leader, because to do so offers the best of the alternative means for need satisfaction. In our culture it is necessary for most people to have a job in order to live satisfactorily.

We usually feel that the individual is free to work or not, and free to choose his employer. Under any but extremely unusual conditions, however, these choices are not "free." The alternative to working is a serious curtailment of need satisfaction for most people—so serious usually that it is not even perceived as an alternative.

Moreover, alternative possibilities of employment are extremely limited for most people most of the time. Jobs are seldom easy to get, and the perquisites which one obtains through seniority built up with one employer represent important potentialities of need satisfaction which must be sacrificed if one seeks other employment. The "labor market" which exists in the perception of the average worker or clerk includes a narrow list of feasible alternatives indeed.

As a consequence, the relationship of the manager-leader in industry to his employees is frequently one in which: (1) his objectives are not their objectives, and (2) the relationship is maintained and the employees accept his

direction of their activities only because to do otherwise would in their eyes represent a serious reduction in need satisfaction.

Within this context, let us examine the alternative methods which the manager-leader may utilize to organize the activities of people and direct them toward organizational objectives. Briefly, there appear to be four. We break them down for purposes of description; in actuality they are seldom, if ever, seen in such purity.

1. The leader may direct the activities of people through his control of scarce means by forcing a choice of means the alternative to which is lesser means or none at all.

The manager in industry is clearly in such a position when jobless men are plentiful, when jobs are scarce and jobs are the only means to survival. He is also in such a position when an employee knows that to be fired is to be black-listed by other employers. As we have seen, even under ordinary labor market conditions he is still in this position to some degree because the worker is seldom in a position to know that he can find another equally satisfactory job immediately. In all three cases the manager controls scarce means which may be better means only because the alternative means are restricted.

The manager utilizing this method directs the activities of his subordinates chiefly by holding over their heads the threat of dismissal if they do not accept his direction. It is an interesting fact that "insubordination" is one of the cardinal sins of industry. Under most labor agreements, the worker can be fired summarily for insubordinate behavior. Reinstatement in cases of this kind, even when the most militant labor unions are involved, are rare today.

The formula for leadership of this kind is: "Do what I say, or else. . . ." To be sure, it is seldom stated as badly as this, but it is implicit in the relationship, and clearly recognized by both leader and "followers." Successful use of this method obviously requires a situation in which the manager controls many important means, and his subordinates control few.<sup>9</sup> Even then, of course, the leader faces the indirect protective and aggressive consequences of the frustration he engenders. Restriction of output, subtle forms of "sabotage," or militant unionism are frequent consequences.

2. The leader may attempt to provide adequate means for the need satisfaction of his subordinates, in the hope that they will accept his direction of their activities out of gratitude and loyalty.

<sup>9</sup> The frustration of managers who, during the lush war years, found their means control drastically reduced pointed up rather sharply their reliance on this method of leadership. By 1945 many of them were wishfully talking about the return of normalcy when there would be more people than jobs and they would be "in the saddle" once more.

This is commonly termed "paternalism." The leader attempts to use his means control in a positive rather than a negative manner. His own objectives (which include organizational objectives) are not those of his subordinates, but he attempts to win their support by aiding them in achieving their objectives.

Historically, this method has been more successful than the first, "or else" method. There are two inherent difficulties, however. One is that the paternalistic approach is by its very nature limited in the kinds of means it can provide. The follower is necessarily put in the position of being the recipient of the leader's benevolences. He cannot achieve independence; he is always in the leader's debt.

At times this type of relationship becomes intolerable to people. They resent being the "children" of a paternalistic leader. There have been several particularly violent "revolts" in paternalistic industrial organizations, stemming apparently from exactly this kind of resentment.<sup>10</sup>

The other difficulty is that paternalism operates in violation of the psychological law of effect. Instead of arranging so that efforts directed toward organizational goals result in increased means for need satisfaction, the paternalistic leader provides the means, and expects the efforts to follow. Minimum "get-by" performance, minimum acceptance of direction, plus an expectation of constantly increasing means are the natural psychological consequences of this Santa Claus-like method of leadership.

The formula for leadership of this kind is: "Do what I say because I am good to you." Implied is the further element: "If you don't do what I say I will not be good to you."

3. The leader may direct the activities of people as a result of a bargain, in which he agrees to provide them with certain means in return for which they agree to permit the direction of their activities within certain specified limits.

This is a common situation in industry today. Management bargains with the Union. Each controls means and each enters into an agreement providing for exchange of means. Through such an agreement the manager-leader obtains the right to direct within limits the activities of people who to that extent become his followers.

The difference between this and the first two methods is chiefly characterized by the freedom of choice possible to the follower. Such freedom is relative, of course, and a matter of the perceptual field of the individual. When bargaining is carried on in good faith in a relationship of mutual confidence, the followers' dependence upon the manager-leader is much less than in either the "or else" situation or the paternalistic situation. Of course, this is just

<sup>10</sup> An interesting example is cited in *Dynamics of Industrial Democracy* by Clinton Golden and Harold Ruttenberg, New York, Harper, 1942, pp. 13-17.

another way of saying that the leader's power (means control) is relatively reduced.

The formula for this type of leadership is: "Let us agree that you will do as I say in certain respects, in return for which I will do what you want in certain other respects." Implied by each party is: If you don't agree, I will prevent you from attaining your objectives."

4. The leader may create conditions such that the objectives he seeks and the objectives his subordinates seek have something in common. Then the direction of their activities becomes to both a "mutual means" for the achievement of his objectives and theirs as well. The activities of the people in achieving their objectives are at the same time the activities the leader desires from them so he can achieve his objectives.

This method of leadership in industry is often talked about but seldom approached in practice. The usual attempt by management is to convince workers by words—by propaganda—that they and management have common objectives. The real problem, however, is at the level of action and not of words. The leader must create conditions such that the people discover through actual experience the mutuality of objectives. Then, and then only, will the leader be encouraged by his followers to direct their activities.

Some of the situations described by Golden and Ruttenberg<sup>11</sup> involve leadership of this fourth kind. Joseph Scanlon, a former associate of Golden and now on the M.I.T. staff, has been experimenting with the development of "cost reduction sharing" plans which are based on this method.<sup>12</sup> In certain respects, James F. Lincoln has successfully created these conditions in the Lincoln Electric Company at Cleveland. A few other daring industrialists are exploring this frontier of human relations in industry.

As applied so far in industry, this method seems to require implementation along two lines. First, there must be a plan which enables the group of workers, as a group, to obtain increased means for need satisfaction from efforts directed toward organizational goals. The monetary means thus obtainable must be clearly, simply, and directly related to achievement, and they must represent a common objective.<sup>13</sup> Equally important to the monetary return are means for the satisfaction of less tangible needs such as those for knowledge, development, participation, recognition, achievement, status.

The second requirement is to provide the opportunity for satisfaction of these social and egoistic needs. Some formal machinery is necessary by which workers, through representative committees, can meet with management to

<sup>11</sup> Golden and Ruttenberg, *op. cit.*

<sup>12</sup> Scanlon, Joseph N., "Adamson and His Profit-sharing Plan," *A.M.A. Production Series No. 172*, 1947.

<sup>13</sup> It is in this respect that most "profit sharing" plans fail, since the group's achievement often has little directly to do with the amount of profit earned by the company.

find solutions to all the problems of more efficient operation of the enterprise. It is through this device, also, that the mutuality of objectives can become a reality.

Leadership of this fourth kind is frequently perceived by managers as involving a tremendous loss of power and control. They feel they would sacrifice their "rights" to direct the activities of their subordinates. Because of the emotional nature of this reliance on personal power in many instances, it is difficult to convince such managers of the incorrectness of their belief. To be sure, they would lose their personal illusion of control in the narrow sense. Moreover, they would be forced to take realistic account of the needs of their subordinates.<sup>14</sup>

However, this method has two positive consequences of tremendous importance. First, because it substitutes the possibility of increased need satisfaction, of many kinds, for the negative fear of reduced need satisfaction, it results in genuine motivation toward organizational objectives. The negative consequences of the first two methods, and of many examples of the third—restriction of output, sabotage, hostility, resistance to change, etc.—vanish into thin air because their causes are removed. Second, this method taps the resources of the whole group. The successful leader of this kind soon discovers the tremendous potentialities for problem solving, for cost reduction, for improved methods, which remain largely latent in the group under other methods of leadership.

Actually, because this method most closely approximates the "natural" relationship of functional leadership, it gives the leader in the end, more rather than less control. His followers perceive him as a positive means to increased need satisfaction; instead of resenting his direction of their activities or accepting it passively, they seek it and encourage it. Reliance on personal power seldom if ever yields this result.

Certainly the phenomenal results obtained by those industrial leaders who have honestly attempted to use this method provide some evidence that the apparent "loss of control" is more than offset by the increased means obtained by leader and followers alike. Our belief is that explorations along this frontier will ultimately demonstrate that past conceptions of leadership have led to a considerable underestimation of the potentialities of organized group effort.

Now let us consider one further aspect of the problem faced by the appointed leader, the leader who by reason of his position in an organization has control of means, whose job it is to direct the activities of his subordinates toward the goals of the organization. In industry he earns his living by leading. He is supposed to be a leader. He is exhorted and implored to lead. He takes training courses in leading. Yet in far too many cases he does not appear to be very successful. His followers don't like him and he does not like to be a leader. He commonly regrets that he must accomplish his objectives

<sup>14</sup> It is perhaps this which lies behind the currently fashionable exhortation to industrial management to acquire a greater sense of "social responsibility."

through people and longs for a mechanical set-up which will not depend on people for its success. Lacking security in his ability as a leader, he tends to depend to an ever greater degree on power, means control, management "rights," and he prays for economic conditions which will give him the whip hand, which will limit alternate choice of means for employees. What is the dilemma of such appointed leaders?

In terms of our frame of reference, there are four methods which a leader may use for directing the activities of people:

1. Force—the leader uses his control of means to force the choice of certain activities which he desires as means. The alternative to following him is reduction of need satisfaction.

2. Paternalism—the leader provides means, and hopes for acceptance of his leadership out of loyalty and gratitude.

3. Bargain—the leader may arrive at a bargain, a more or less voluntary choice, made by each party to furnish certain means in return for certain means.

4. Mutual means—the leader creates the situation in which certain activities of his and of the group, if performed together, will serve as mutual means, means for each to satisfy their own (perhaps different) needs.

The appointed leader, however, is not free to choose among these methods. To a greater or less extent the method is prescribed by the policy of the organization in which he leads. In general today in industrial organizations the method lies somewhere in the region between force and bargaining. The initial concept of leadership in industry seems to have been that of force. Paternalism enjoyed popularity for many years among some managers; it is generally frowned upon but widely practiced today. The rise of unions made possible the opposition of force to force and created the necessity for bargaining.

Today bargaining is the common method used by management to obtain direction of those activities necessary to management's objectives. The appointed leader, endowed with such management "prerogatives"—means control—as management has been able to salvage at the bargaining table, is expected to lead. What leading means will depend on the attitude of his top management and its policy. The frame of reference within which he must lead has been established over a considerable period and is fixed in the attitudes of his subordinates as well as his superiors. Yet he is exhorted to be a good leader; he is trained to use this or that technique; his effectiveness is examined through morale surveys. He is prompted to be tough, to be fair, to use consultative supervision but to retain management rights. The dilemma of the appointed leader is simply that he must succeed as a leader despite the fact that he cannot control the conditions in terms of which he leads.

The essence of leadership lies in the functional relationship between leader and followers. When the conditions of the relationship are established not by the leader but by the policy of the organization, and when that policy favors the "or else" method, or paternalism, or a grudging and hostile bargaining

method, the leader is on the spot. He appears to be on the spot in many cases today in industry. In fact, the methods of force and bargaining seem to be somewhat on the spot also. Although force can be used to control the activities of people, it engenders opposing force, and it often defeats its own purpose.

The method of bargaining backed by force is beginning to seem inadequate even to those who cannot conceive of an alternative. Where bargaining rests on mutual respect and force has dropped out, the situation is not too bad. In such cases the mutuality of means which exists, although tenuous, becomes more apparent. "The greater the profits of the company, the larger the cut to labor" idea.

From there to the fourth method is not too impossible a step, although it requires skill, understanding and imagination of a very high order. When management successfully creates the necessary conditions, the organization and its objective become a means not only to management but also to labor. Through this mutual means each satisfies needs. A leader in this situation is a man whose direction of activities is an effective aid for all concerned to attain their objectives. Under such circumstances, the dilemma of the appointed leader disappears.

#### 4. Study of Executive Leadership in Business. The R, A, and D Scales

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*C. G. Browne*

Reprinted from the *Journal of Applied Psychology*, 1949, 33, 521-526, by permission of the author and of The American Psychological Association, Inc. The author describes a new technique for measuring responsibility, authority, and delegation of authority in industrial leadership situations. Through the application of a series of scales it was found that executives estimated the authority which they delegate to be less than either their own responsibility or authority. They also tended to estimate their authority as less than their responsibility.

This is the first in a series of papers which will present the following methods for the study of leadership and executive relationships in business: R, A, and D scales; social and organizational contacts; sociometric pattern; Goal and Achievement index (1).

The total study proceeded on the following hypotheses: (1) leadership is a process based upon the inter-relationships of individuals in a group which

is working toward a goal that has been accepted as desirable; (2) executive function and leadership in business is a process of the interaction of social and working relationships within and outside of the executive groups; and (3) executive and leader relationships can be analyzed through the application of methods which are not designed to measure personal executive traits as psychological entities.

**Procedure.** The subjects in these explorations were 24 executives of a tire and rubber company in Ohio, named the Congo Tire and Rubber Company for purposes of the study. Table 1 includes a listing of the executives by title and department. All of the company executives on the first, second, and fourth echelons of the business, and all of the executives on the third echelon with one exception were included. Data were obtained in a moderately structured interview, varying in length from  $2\frac{1}{2}$  to  $3\frac{1}{2}$  hours. Some of the executives completed the R, A, and D scales during the interview, while others completed them at another time. In all cases, the scales were explained during the interview.

**R, A, and D Scales.** The RAD index form devised by Stogdill and Shartle in their studies of Naval leadership consists of six scales, each containing eight statements (4). Scales A and B are for Responsibility; scales C and D, for Authority; and scales E and F, for Delegation of authority. The person completing the forms checks his first and second choices of statements as they best apply to him on each of the six scales.<sup>1</sup> The following are examples of the statements for each of the variables: *Responsibility*, "I am responsible for the successful operation and coordination of all activities in the organization"; *Authority*, "I make no decisions whatsoever but request instructions from my superior on all matters"; *Delegation of authority*, "I have delegated full authority to my assistants, allowing them complete right of decision in all functions."

Scoring of the individual items on each scale was developed using the Thurstone equal appearing interval technique (5). To establish scale values, the statements were evaluated by staff, graduate students, and seniors in psychology at the Ohio State University. The mean of the point values of the four statements checked is the score on that variable. Scale values for the statements range from 1.0 (indicating a high degree of the factor) to 8.7 (indicating a low degree). *Therefore, the lower scores indicate a higher degree of the item measured, while the higher scores indicate a lower degree.*

**R, A, and D Scores.** The R, A, and D scores of each executive, the mean scores by departmental and total groups, and the range for each factor are given in Table 1. Remembering that the lower scores indicate a higher degree

<sup>1</sup> Requests for information regarding the R, A, and D scales may be addressed to Dr. R. M. Stogdill, Associate Director, Ohio State University Leadership Studies, The Ohio State University, Columbus, 10, Ohio.

TABLE 1. R, A, AND D SCORES

Executive Department and Title	R Score	A Score	D Score
<b>General Administration:</b>			
President and genl. manager.....	1.6	1.6	2.7
Secretary of the company.....	3.2	4.3	6.7
Director public relations.....	3.3	2.9	3.8
Purchasing agent.....	3.9	3.6	6.4
Department mean.....	3.0	3.1	4.9
<b>Sales:</b>			
Vice-president-sales.....	2.7	3.5	2.3
Sales manager.....	2.7	2.9	3.0
Manager Congo stores.....	2.7	3.8	4.5
Manager sales promotion.....	2.7	3.4	4.9
Manager sales orders.....	2.7	4.4	4.9
Manager tube sales.....	5.2	5.1	5.1
Department mean.....	3.1	3.8	4.1
<b>Finance:</b>			
Treasurer.....	2.7	4.1	4.9
Comptroller.....	2.7	3.4	3.8
Supervisor cost accounting.....	2.9	4.1	5.2
Chief accountant.....	3.3	3.4	6.2
Department mean.....	2.9	3.7	5.0
<b>Manufacturing:</b>			
Vice-president-manufacturing.....	3.0	2.9	3.2
Plant engineer.....	3.7	4.4	4.0
Chief chemist.....	3.7	3.4	3.8
Product engineer.....	2.7	3.6	3.8
Foreman bicycle tire production.....	3.7	4.7	2.9
Manager production control.....	2.9	3.4	4.4
Manager quality control.....	2.7	4.5	5.5
Manager shipping.....	3.3	4.3	6.0
Department mean.....	3.2	3.9	4.2
<b>Personnel:</b>			
Personnel director.....	3.2	2.3	2.5
Industrial engineer.....	3.2	2.3	3.3
Department mean.....	3.2	2.3	2.9
Total group mean.....	3.1	3.6	4.3
Range.....	1.6-5.2	1.6-5.1	2.3-6.7

of the factor, the score of 1.6 for the president and general manager represents the highest for both R and A. Likewise, the scores of 5.2 and 5.1 for the manager of tube sales represent the lowest for R and A, respectively. The vice-president-sales had the highest D score, and he was also one of the three executives who received the greatest number of choices on the sociometric diagram. While the secretary of the company had the lowest D score (6.7),

an analysis of his work revealed that he had no one under his supervision to whom he could delegate the relatively small degree of authority which he estimated he had.

In any measure—individual scores, departmental means, or total means—the R scores were almost consistently the highest, followed by the A scores, and finally the D scores. This indicates a general trend for the executives to estimate that they delegated authority in a lesser amount than they estimated either their responsibility or authority, and that their authority was less than their responsibility. Although the ranges of the R and A scores were almost identical, there was a concentration of R scores, there being 22 cases between 2.7 and 3.9, with a mode of 2.8 for all R scores. The A scores, however, distributed more uniformly, with a mode of 4.3, while the D scores had the greatest range, but were distributed most uniformly. There were 17 D scores lower than 3.3, compared with 18 R scores of 3.3 or higher.

While these scores cannot be considered to be predictive of executives in other companies on the basis of work done, or departmental assignment, or echelon level, the method offers opportunities to study working relationships between executives which may be related to any of these variables. As a measure of communication within the company and of other personal relationships, the R, A, and D scales offer further possibilities. These measures might be obtained by a study in which an executive's seniors complete R and A forms for him and his juniors complete D forms for him. A comparison of these scores with the executive's own forms would constitute a measure of the individual's understanding of his responsibility and authority from the seniors who determine them and of his delegation of authority from the juniors to whom delegation is made.

**R, A, and D Relationships.** Table 2 includes correlation coefficients between R, A, and D and other variables used in the study. *These correlations are descriptive only of the relationships existing between the variables for this particular population of executives. They cannot be interpreted as sampling statistics, since the group of executives studied here does not constitute a statistical sample.*

The inter-correlations between the three factors were .56 for R and A; .29 for R and D; and .54 for A and D. In the studies of Naval leadership, unpublished correlations for a group of 40 Naval officers were found to be .56 for R and A; .16 for R and D; and .86 for A and D. These comparative correlations between the business executives and the Naval officers indicate the same general trend in the inter-correlations between factors, although the Navy correlation of .86 for A and D was considerably higher than the executive correlation of .54 for the same factors. Some of this difference may have been due to the possibility that such concepts as authority and the delegation of it are more clearly defined for military personnel than they are for business

TABLE 2. PRODUCT MOMENT INTER-CORRELATIONS OF R, A, AND D SCORES AND R, A, AND D SCORES CORRELATED WITH OTHER VARIABLES

Variable (N = 24)	R	A	D
R (Responsibility).....	x	.56	.29
A (Authority).....	.56	x	.54
D (Delegation of authority).....	.29	.54	x
Time spent in supervision **.....	-.06 *	-.25 *	-.12 *
Number of choices ***.....	.29 *	.28 *	.48 *
Executive's salary.....	.48 *	.41 *	.49 *
Executive's echelon.....	.34	.40	.14

\* The sign for this correlation has been changed so that in interpreting the correlations a large score in one variable is also indicative of a large score in or a greater degree of the second variable.

\*\* This variable was expressed in the per cent of the executive's total time which he estimated he spent in supervision.

\*\*\* As determined from the sociometric diagram.

executives, and that they are measured and weighed with greater absoluteness in the military environment.

The correlation between authority and time spent in supervision, the largest of the three negative correlations between these variables, was  $-.25$ . This indicates that the executive who devoted a greater percentage of his time to supervisory activities, as contrasted with such other activities as planning or coordination or evaluation, tended to have an A score which represented a lesser amount of authority.

In a later paper, the sociometric pattern which was used in the study will be discussed. The "number of choices" variable was determined from the listing which each executive made of the men with whom he spent most time in getting his work done. In the sociometric diagram, the greatest number of choices was received by three executives who were in the second echelon. The relatively high positive correlation of  $.48$  between number of choices and D score indicates that those men who were consulted most and with whom most time was spent in getting work done also tended to be the men who were delegating authority to the greatest degree.

The correlations between R, A, and D scores and salary all indicate that executives with the higher salaries tended to have scores which indicated a greater degree of the three factors. In view of the low correlation between echelon and D score, the relatively high correlation of  $.49$  between salary and D score may be surprising. However, this correlation is strongly influenced by the fact that several of the executives on the fourth echelon were receiving higher salaries than some of the executives on the second and third echelon.

The correlations between R, A, and D scores and echelon were not as high as they were with salary. However, it is quite logical that the correlations with echelon were highest for responsibility and authority, since it can be expected that the higher level executives would have a higher index on these factors. Delegation of authority, on the other hand, is an individualized factor, not greatly related to the executive's echelon.

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## Part Ten: INDUSTRIAL RELATIONS

### 1. Communication between Management and Workers \*

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*Donald G. Paterson  
James J. Jenkins*

Reprinted from *Journal of Applied Psychology*, 1948, 32, 71-80, by permission of the authors and of the American Psychological Association, Inc. The literature of industrial relations has often failed to emphasize the importance of communicating in language that is understandable to the "average man." By using the Flesch method of measuring readability, an industrial form designed to provide information to job applicants is compared with a revised form prepared by the authors, using the rules of simplicity and understandability suggested by several writers.

The general problem of communication between management and workers has been receiving increased emphasis in recent industrial personnel literature.

**History of the Problem.** Roethlisberger (19), Roethlisberger and Dickson (20), Gardner (7), Mayo (12), and Pigors and Myers (15) may be taken as examples of the recent emphasis on the factory as a social institution in which problems of structure, status, coordination and cooperation of groups and communication between top management and rank and file workers are stressed and discussed at length. For example, there are 21 references to communication in the index of Gardner's book. But in these approaches no hint is given as to how written communications should be formulated or how the problem of readability can be attacked in an objective manner. In Pigors and Myers (15) the employee handbook is recommended as the principal medium of communication with stress on content. The only reference to readability is that it be "clearly written" but no information is given as to how this can be accomplished or, if attempted, how the readability of the content may be measured.

\* The writers have used the conventional term management and workers throughout this paper. Dr. Dale Yoder, Director of the Industrial Relations Center at the University of Minnesota, suggests that a better terminology would be "managements and employees" because management is an abstraction. Furthermore, he believes that the term employees is to be preferred to workers since the latter includes all members of the labor force (managers, self-employed, rank and file employees, and others).

In the more comprehensive texts on industrial relations and personnel work such authors as Yoder (26), Scott, *et al.* (21), and Watkins and Dodd (25) discuss the problem of communication between management and workers in a more practical manner in terms of the makeup and content of employee handbooks, house organs, employee magazines, and bulletin board notices. But here again, although the admonition may be given that these should be written and edited for clarity and interest-holding power, no information is given as to how this can be done or as to how readability may be determined. Watkins and Dodd do give one hint, namely, that some employee magazines have failed because they have been "too high brow" for the man in the shop.

Heron (8a) devotes a whole book to the problem of sharing information with employees and, in our opinion, provides an excellent discussion of the compelling reasons for the necessity of such sharing as a prime function in industrial relations work. Unfortunately, the technical problem of how-to-do-it, in the sense of insuring comprehensibility and interest-holding power of printed communications, is not touched upon.

Filipetti, in his survey (3) of the literature of scientific management from the days of Frederick W. Taylor through World War II, does not mention the problem of communication. The index to his book does not contain any items such as communication, employee handbooks, bulletin board notices or readability. Presumably, information about scientific management procedures and techniques is transmitted from management to workers by verbal means only.

Even Powell and Schild (18), writing for the American Management Association and attempting to tell management how to prepare and publish an employee manual, fail to come to grips with the problem of readability. Their manual summarizes the results of a survey of company practices and gives selected samples from "good handbooks." It also states, "Try to make it attractive and as readable as possible" (18, p. 22) but the description of a technique for testing the readability of the language of employee handbooks is conspicuously absent.

The industrial psychologists do no better. Oakley (13), Tiffin (24), Maier (11), Burtt (2), and Poffenberger (17) do not even mention the problem of communication nor such media as employee handbooks, house organs, or bulletin board notices.<sup>1</sup>

The strange thing is that applied psychologists in dealing with the psy-

<sup>1</sup> Recently, increasing attention has been given, however, by industrial relations experts to the problem of simplifying the communication of financial statements to employees and by these same experts and personnel psychologists to the problem of arranging adequate means of communicating the feelings and attitudes of the rank and file to top management through suggestion systems and attitude and morale surveys. In opinion polling a great deal of attention has been given to the wording of questions so that they will be well within the comprehension level of the "average man" (21, 22, 24, 25, 26).

chology of advertising devote a great deal of space to the problem of making advertising copy readable. See Kitson (10), Poffenberger (16) and Burtt (1). Not only is the problem recognized by these authors but sufficient facts and descriptions of methodology are given to aid the advertising copy writer in making his copy readily comprehensible to the "average man." As a matter of historic fact, Kitson (10) as early as 1921 developed an objective method of measuring the differences in readability or comprehensibility and applied it to newspaper and magazine copy. He used frequency with which one, two, three, etc. syllable words are found, coupled with the average length of sentences. He seems to have been the real pioneer.

The above paradox is most striking in that Burtt and Poffenberger, when they shift from advertising to vocational employment and industrial psychology, fail to stress or rather fail to mention the problem of communication and hence give no hints as to how to measure the readability of copy in communication from management to the workers. Poffenberger (17) in his book on applied psychology devotes only 37 pages to advertising yet stresses readability whereas he devotes 227 pages to vocational employment, and industrial psychology without mentioning the problem of communication in the latter situations. Burtt in his 568 pages on employment psychology (2) likewise fails to mention the problem although he devotes adequate space to the problem of readability in his book on advertising.<sup>2</sup>

The problem of readability, however, has been treated far more adequately by Smith, Lasswell, and Casey (22), by Gray and Leary (8) and more recently by Flesch (4, 5, 6). Again, as a matter of historic fact, W. S. Gray seems to have been alert to the need for an index of readability. As early as 1935 he had developed mathematical formulae for measuring degrees of readability and applied them in obtaining indexes of difficulty of 350 books. Unfortunately his method does not seem to have "caught on."

Of course, at a still earlier date Thorndike (23) and Horn (9) had produced word counts that were used not only by authors in writing text books for children but also by advertisers in simplifying the vocabulary of advertising copy.

All of this historical introduction points to a "cultural lag"<sup>3</sup> in applying

<sup>2</sup> The senior writer pleads guilty to the same offense because when he taught advertising psychology and personnel psychology simultaneously during the 1920's he stressed readability in advertising but failed to recognize its applicability in personnel work.

<sup>3</sup> The phenomenon of "cultural lag" described so ably by Ogburn (14) is important and ever present in any field of knowledge or activity. In psychology many instances could be cited. In this particular matter, the lag seems to have been prolonged by compartmentalized thinking in which people as consumers are recognized as of primary importance whereas people as workers are accorded a secondary role from the point of view of their needs for an understanding of the policies and practices followed by top management.

**APPLICANTS \*\* GENERAL INFORMATION—FORM A**

Before completing your application it would be advantageous for each applicant to know something about our Company, the products we manufacture, and the employment opportunities for both experienced and inexperienced persons.

**TYPE OF WORK**—Our Company manufactures a very high quality line of women's and children's underwear, women's nightwear and slips.

**IS IT NECESSARY TO HAVE EXPERIENCE**—Many organizations follow the policy of employing only experienced operators. Although it is desirable that applicants have had some training, our records indicate that many of our highest-paid operators have had no previous experience or training before they entered our employ. Sincere interest in this type of work is much more important than previous experience in some other organization.

**CAN ANYONE LEARN THIS WORK**—We do not encourage everyone who makes application to enter this industry. We recognize that some applicants are not interested or suited for this work, just as there are women who are not suited by temperament to enter office work, nursing, or some similar vocation. It would be unfair to you as an applicant, and to the Company if we were to adopt a policy of hiring all applicants.

**HOW LONG DOES IT TAKE TO BECOME A GOOD OPERATOR**—A power sewing machine, like a typewriter, comptometer or calculator, is an intricate piece of equipment. A student entering business college spends six months acquiring the fundamentals of typing. Speed and proficiency are acquired only with practice and experience in a business office. The average person with an aptitude for sewing can learn to operate a machine in from 2 to 3 months and become an experienced and skilled operator in from 4 to 6 months. We are required to make an expenditure of more than \$300 for the training for each operator.

**HOW MUCH CAN I EARN AS A POWER SEWING MACHINE OPERATOR**—All persons entering our employ are guaranteed 60¢ an hour for the first 3 months and 65¢ an hour thereafter. Our plant average for persons on piece work and having a minimum

FIG. 1. Copy of original information sheet for potential applicants (Form A).<sup>4</sup>

to personnel work what has long been known in the field of advertising and in the writing of text books for children and for the "average adult." To be sure, the problem of communication between management and workers may have been regarded as of minor importance. But industrial relations experts and personnel psychologists can no longer ignore the problem especially in view

<sup>4</sup> The reader will notice that the section headings are set in *all capitals* in Form A, as in the original, but that *caps and lower case, bold face* are used in Form B. This has been done in order to direct attention to the importance of using the best possible typographical arrangement to promote speed and ease of reading the copy. This is another important though frequently neglected aspect of the problem of printed communications. See Paterson, D. G. and Tinker, M. A. *How to make type readable*. New York: Harper and Brothers, 1940. Pp. 209. (Obtainable from the writers.)

## APPLICANTS \*\* GENERAL INFORMATION—FORM A (Cont.)

of 6 months' experience or more is approximately \$1.00 an hour. We do not wish you to assume that you will be paid \$1.00 an hour at the end of your training period or at the end of the 6 months' period, however, fair piece work rates assure you the opportunity of earning in proportion to your ability. We desire to train only those persons interested in continuous employment.

**WHAT ARE THE ADVANTAGES OVER OTHER TYPES OF WORK OPEN TO WOMEN**—Persons employed in this industry and by this organization are assured of permanent employment, at light, clean, interesting work which most women enjoy. Many industries have openings for only unskilled or semi-skilled work, such as food packaging, stock work, and retail selling. These positions, for the most part, require very little training and the earning opportunities are therefore definitely limited.

**IS IT POSSIBLE TO DETERMINE WHETHER AN APPLICANT CAN BECOME A SUCCESSFUL OPERATOR**—It is difficult because of the great differences in individuals to be 100% accurate in selecting potentially successful operators. We know that most persons who have normal vision and above average finger dexterity will be successful if they are truly interested, have patience, and will carefully follow the instructions of our training supervisors.

If you are interested in this employment opportunity, it will be necessary for you to complete the attached Application and Supplementary Information Schedule. You will then be given an eye test in this office and referred to the U.S. Employment Service where you will take several short simple tests. Our records indicate that, all other factors being equal, persons who do well in these tests usually become skillful highly-paid operators.

We wish to state in conclusion that if you are selected for employment we will do everything possible to assure your success. Our instructors will assist and teach you during your training period; and they will be constantly available for guidance and direction. During the past year many persons have entered our employ and have become a permanent and satisfied part of this organization.

FIG. 1 (Cont.)

of the importance attached to communication by those who are now stressing the social structure and human relations approach to management problems in business and industry. The effectiveness with which the Flesch formula can now be applied to the problem also forces the issue.

**A Sample Study.** In setting up a problem dealing with the selection of power sewing machine operators in a textile factory, the writers were impressed by the attempt of the personnel manager to put in the hands of applicants a printed statement in regard to employment opportunities. Here was a time saver. No longer need the preliminary interviewer give a verbal description of the Company and its hiring policies prior to application taking. Here was a conscious attempt to give each potential applicant a picture of the situation so that each could decide whether or not to put in an application. The applicant information sheet (Form A) is reproduced as Figure 1.

## Information for Applicants—Form B

**Before You Apply.** We think you would like to know something about our Company. This page tells you what we make and how *you* will fit into the jobs we offer.

**What Do We Make?** We make a very high quality type of women's and children's underwear, women's nightwear and slips. We make these with electric sewing machines like those in many homes.

**Do You Need Experience?** Some companies only hire people who have done this kind of work before. Some companies demand experience. We do not. Why? Because our records show that many of our best-paid workers started work here without experience. Some had never worked before. Now they are very good workers. We like to hire trained workers but we know that real interest in sewing and real ability come first.

**Can Anyone Learn This Work?** No. Some people are not interested in it or suited for it. You know some women who are not good bets for office work, nursing or other special jobs. In the same way, some women are not good bets for our jobs. It would not be fair to you if we hired you for a job you did not like or could not do. If we hire you, it means we think you are really fitted for this work.

**How Soon Can You Become a Good Worker?** People in business school spend six months learning to type or run an electric calculator. Speed and good work come only with practice in school and on the job. Most people we hire can learn to sew well on our electric machines in 2 or 3 months. Some can learn in less time. It usually takes 4 to 6 months to become highly skilled. It costs us more than \$300 to train you. This is why we have to be careful about hiring the right kind of worker.

**How Much Can You Earn in Our Company?** You are *guaranteed* 60¢ an hour for the first 3 months and 65¢ an hour after that. Most of our workers with 6 months' experience are making \$1.02 an hour. Fair piece work rates give you the chance to earn according to your ability. We like to hire only people who want steady work. And we want those people to be able to earn \$1.00 an hour or more.

### What Are Your Advantages Here?

1. People hired by us are sure of *steady* work.
2. Most women enjoy this work which is light, clean and interesting.
3. Pay is higher for this work than for unskilled or partly skilled work such as stock work, food wrapping or selling, which most firms in Minneapolis offer. Such jobs can be learned in a week or two and pay is therefore much less than \$1.00 an hour.
4. The women who work here are the kind you will enjoy working with.

**How Can You Find Out if You Can Be Good in This Work?** This is hard to do because there are great differences between people. But we know that most people who have normal eye-sight and nimble fingers will succeed. Of course, you must be interested in sewing machine work, have patience and follow the training of our teachers.

**Can You Get Work with Us?** Yes, if you will do these things and measure up to our standards.

1. Fill in the Application Blank.
2. Answer Supplementary Information Schedule.
3. Take an eye-sight test in this office.
4. Go to the U.S. Employment Office, 501 1st Avenue North, where you will take several short simple tests for nimble fingers. Our records show that those who do well in these tests usually become good operators with high earnings.

**Will We Help You Succeed?** Yes. If you are hired we will do our best to help you make good. Our teachers will train you and help you during your training period. When you are ready for regular work, our foremen and workers will help you to make good. All of us want you to make good and to become a satisfied worker.

FIG. 2. Copy of simplified information sheet for potential applicants (Form B).

A glance at the wording suggested to the writers that it was probably pitched at a readability level far beyond the comprehension capacity of the average applicant for factory work. This led to an attempt to simplify the language and structure and to increase its human interest value without changing the ideas contained in Form A. This was done by following the rules of Flesch (6). The resulting Form B is shown as Figure 2.

A glance at Form B is enough to reveal that it is couched in much simpler language (shorter sentences, easier vocabulary content) and may be expected to have a higher human interest value (use of pronouns "you" and "we") than is true of Form A.

The question, however, arises as to precisely how difficult Form A is and to what degree the difficulty of Form B is decreased as compared with Form A. Furthermore, how much better adjusted is the language of Form B to the comprehension level of the "average applicant"?

To answer these questions we employed the Flesch method of measuring readability to all sections of both forms. The results are shown in Table 1. In applying the Flesch formula (6) units of 100 words each were measured

TABLE 1. FLESCH READABILITY MEASUREMENTS AND DIFFICULTY INTERPRETATIONS OF INFORMATION SHEETS FOR APPLICANTS, FORMS A AND B

	Readability Score	Difficulty Level	Typical Magazine	School Grade Level
<b>Form A:</b>				
Section 1.....	6.49	Very hard	Scientific	College
Section 2.....	5.77	Hard	Academic	H. S. or some college
Section 3.....	5.46	Hard	Academic	H. S. or some college
Section 4.....	5.41	Hard	Academic	H. S. or some college
Section 5.....	6.77	Very hard	Scientific	College
Section 6.....	4.89	Fairly hard	Quality	Some H. S.
<b>Total (all sections)...</b>	<b>5.81</b>	<b>Hard</b>	<b>Academic</b>	<b>H. S. or some college</b>
<b>Form B:</b>				
Section 1.....	1.96	Easy	Pulp mag.	5th grade
Section 2.....	1.68	Easy	Pulp mag.	5th grade
Section 3.....	2.27	Fairly easy	Slick fiction	6th grade
Section 4.....	2.02	Fairly easy	Slick fiction	6th grade
Section 5.....	2.27	Fairly easy	Slick fiction	6th grade
Section 6.....	0.96	Very easy	Comics	4th grade
<b>Total (all sections)...</b>	<b>1.84</b>	<b>Easy</b>	<b>Pulp mag.</b>	<b>5th grade</b>

as sections. Section 6, since Form B was shorter, did not run to 100 words so extrapolation was resorted to.

It will be noted that Form A had been written at the "Hard to Read" level of difficulty appropriate for high school or college students. There is some variability from section to section from "Fairly Hard" to "Very Hard." It should be noted that the first section of Form A was written at the level characteristic of scientific writing requiring college level attainment to understand.

Form B on the other hand was written on an "Easy" level which can be comprehended by those with only a fifth grade educational attainment level. There is also some variability from section to section ranging from "Very Easy" to "Fairly Easy."

The objection may be raised immediately by some that by presenting such simple 4th, 5th and 6th grade level language that the personnel department runs a grave risk of insulting the intelligence of the applicants most of whom have probably had some high school training. One need only re-read Form B to realize that simplification of language need not result in "childish" writing nor is there anything in the information as given or as it is stated that would insult the intelligence of anyone. Bright people can quickly understand Form B. But dull people or even "average" people cannot understand or at least will have great difficulty in understanding text material suitable for college students. While we believe that Form A deserves the label "high brow," we do not believe that Form B deserves the label "low brow." If this be accepted, there can be no quarrel with the simplicity of Form B.

One other point deserves mention. Form B includes many more personal pronouns which Flesch insists is a legitimate technique for enhancing the interest value of any type of writing whether it be "Very Hard" or "Very Easy."

#### SUMMARY

1. The literature of industrial relations and personnel work has either ignored the problem of communication between management and workers or has failed to emphasize the importance of communicating in language that the "average man" can understand and has given no hints as to the techniques of readability measurement that can be applied.

2. The literature of advertising, however, is in marked contrast. Here the necessity of putting advertising copy into simple language has been emphasized and ways and means of doing so have been stressed.

3. Although Kitson in 1921 and W. S. Gray in 1935 developed ways and means of testing the readability of printed prose, it remained for Flesch to develop and "put across" a tedious but accurate method of readability measurement. His method can now be applied to communications between management and workers as well as in many other fields.

4. A sample study was made of an information sheet for potential applicants in a needle trades factory. Its Flesch readability score classified it as "hard," typical

of an academic type magazine and requiring a high school or some college level of reading ability to comprehend it. A simpler form was prepared, preserving the ideas, and the resulting Flesch readability score was found to be "Easy," typical of pulp fiction writing and comprehensible to those with a 5th grade level of reading ability.

5. The rules set forth by Kitson (10), Thorndike (23), Horn (9), and Flesch (6) for making printed copy easy to understand and at the same time interesting should be followed by those who wish to prepare copy that will be readily understood by applicants for factory jobs. These are: (a) Use short sentences; (b) use words of one or two syllables; (c) use simple sentence structure; (d) use words in frequent use by consulting word lists; (e) avoid unnecessary adjectives and (f) make the message personal by using personal pronouns.

6. The literature on industrial relations and personnel psychology should, henceforth, not only place greater emphasis on the importance of communication but should devote much more attention to the "how-to-do-it" aspect of insuring communications that will be readable to the man in the shop and will rate high in interest value.

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## 2. A Collective Bargaining Check-list

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*Arnold F. Campo*

Reprinted from *Advanced Management*, 1949, 14, No. 2, 73-75, by permission of the author, The Society for The Advancement of Management, and the Director of the Division of Industrial Relations, Stanford University Graduate School of Business, from whose office Mr. Campo's article was originally issued. The author, a union officer, outlines the conditions essential for effective collective bargaining, together with the policies and procedures that should be followed by both management and labor in negotiating the contract and living under the agreement.

### Conditions Essential for Effective Collective Bargaining

#### *For Both Union and Management:*

1. Collective bargaining should be made an educational as well as a bargaining process. It should afford union leaders an opportunity to present to management the wants, desires, grievances and attitudes of its employees and enable management to explain to union leaders and, through them, their employees the problems and economic forces that confront it.
2. Management and the union must conceive of collective bargaining as a means to find the best possible solution, not as a means of acquiring as much as one can while conceding the minimum. There must be an honest attempt to solve rather than to compromise.
3. Both parties must have enough bargaining power to command respect and to enforce the terms of the contract.
4. There must be mutual confidence, good faith and a desire to make collective bargaining work.
5. Honest, able and responsible leadership is necessary.
6. Parties must meticulously observe the national and state laws applicable to collective bargaining.
7. It is important that both parties realize that collective bargaining in a sense is a form of price-fixing and that successful collective bargaining in the last analysis depends on whether the union and management do a good job at keeping the price of labor properly adjusted to other prices.

#### *For Management:*

1. Management must develop and consistently follow a realistic labor policy which should be accepted and carried out by all its representatives.

2. Because the union must feel that its existence is secure, management must grant recognition to union without reservations and accept it as a constructive force in the industry.

3. Management should not assume uninterrupted continuance of employee good will. It should periodically examine the rules and regulations—including those that supervisors use and enforce—by which the labor force is governed. These determine the attitudes, comfort and good will of employees.

4. Management should act upon the assumption that to make the union a responsible and conservative body it is necessary to treat it fairly and to establish such a satisfactory business relationship with its representatives that they and the union members will not lightly jeopardize that relationship.

5. Management should not wait for the union to raise grievances but should make every reasonable effort to prevent them from arising and to remove them promptly when they arise.

6. For any bargaining unit, management should deal with only one union, but where two unions seek recognition, no negotiations should be undertaken until one union establishes a majority.

7. In weighing the economic implications of collective bargaining, management should give more emphasis to social considerations.

#### *For Union:*

1. In the light of the rights granted to organized labor in recent years, it is incumbent upon each union to eliminate racketeering and other undemocratic practices within its own organization.

2. Union leaders must understand the economic implications of collective bargaining and realize that union demands must be met from the income and resources of the industry.

3. Union leaders should not conceive of their function as merely to obtain higher wages, shorter hours and better working conditions for their members. They and their members have an obligation to assist in eliminating waste and in improving the quantity and quality of production.

4. Union leaders have an obligation to remove restrictive rules and regulations on the part of union members since they increase costs and prices, reduce the amount that can be paid out as wages, tend to make for less employment, and in the long run lower the standard of living of all groups in society.

5. Unions should resort to strikes only when all other methods have failed to bring about a satisfactory settlement of the issue or issues involved.

#### **Policies and Procedures to Be Followed in Negotiating the Contract**

#### *For Both Union and Management:*

1. Be friendly in negotiation. Introduce everybody. Relieve any existing tension.

2. Be willing to listen. It is time enough to worry about how you will say "No" *after* you have heard the facts.
3. Give everyone an opportunity to state his position. This often discloses the real champion of the problem or grievance.
4. Know something about the personal history of the other party's representatives.
5. Always keep in mind the right and fair thing to do.
6. Both parties should strive to maintain an objective attitude. They should think rather than feel their way through the problem under consideration.
7. Don't attempt to guide the discussion along a straight line directed to solving the problem. Let it wander at times; don't hurry it.
8. Don't let negotiations reach a stalemate. Help to define the problem and to suggest the solution. Ultimatums are out of place in negotiations.
9. If facts disclose a need for doing more than solving the immediate problem, be willing to go as far as is justified.
10. Define each issue clearly and discuss it in the light of all available facts.
11. Avoid specific regulations and minute details in the contract to insure greater flexibility.
12. At all times search only for the correct and real solution.
13. Size of the conference should be kept as small as circumstances will permit. Small groups facilitate successful negotiations.
14. Avoid sharp practices.
15. Consideration should be given to fatigue and mental attitude in determining the length of the session.
16. Have a committee of employees present during the negotiations; it can be highly advantageous and is practical in case the bargaining unit is a single establishment.
17. Terms agreed upon should be in writing and parties should sign without mental reservations. Phrasing of contract should be realistic, not legalistic.
18. Arbitration in the making of agreements should be used only as a last resort.
19. Both parties should respect the rights of the public at all times.

*For Management:*

1. At the outset, management must make sure that the labor leaders are really the representatives of the workers in the bargaining unit.
2. Don't use lawyers as negotiators unless they have an intimate knowledge of industrial relations.
3. Don't limit contracts with the union to controversial subjects, but consider also matters of common interest.
4. Minor concessions that serve "face-saving" purposes should be granted by management.

5. Ridiculous demands should be tactfully sidetracked rather than ridiculed.

6. Management should inform labor and union representatives about the factors and conditions that determine employer policies.

7. Management should not refuse employees' demands until ample consideration has been given them.

8. Use any opportunities to:

a. Educate the committee;

b. Help disclose bias or prejudice;

c. Show how established company policies make actions necessary;

d. Iron out any unrelated or related grievances that may come to light.

9. Be friends as negotiations end. Don't shut the door on further consideration of the problem. Show willingness to listen to new facts when and if developed.

10. When a demand has to be rejected management should give the union representatives all the facts and help them to place management's views before the workers.

11. Management must take a broad viewpoint. It should help the union to analyze their demands and to determine their fairness and propriety.

12. Make sure the negotiating committee is agreed on the fairness of the solution of the problem, and that they have sufficient facts to show their constituents that the solution is a fair one.

#### *For Union:*

1. Union leaders should not bring conflicting social theories into the negotiating procedure.

### **Policies and Procedures to Be Used in Living under the Agreement**

#### *For Both Union and Management:*

1. Both sides should make a genuine effort to make the machinery for collective bargaining function. This requires a tolerant attitude, a spirit of accommodation, good will and a willingness to cooperate.

2. The channels for handling grievances must be observed. It is considered good practice to:

a. Instruct everyone as to its workings;

b. Handle all grievances promptly;

c. Put grievances in writing and indicate the facts on which both parties agree;

d. Hold meetings of grievance committees on company time;

e. See that supervisors and foremen are not short-circuited; to do so destroys morale;

- f. Avoid cluttering the grievance procedure with matters that are not really grievances.
- 3. When conferences over grievances reach an impasse the matter should be submitted to arbitration. Arbitrators should be selected with care.
- 4. Both parties should make sure that every commitment is scrupulously fulfilled. The use of a rigid follow-up guarantee observance is recommended.

*For Management:*

- 1. Management should be available for conferences with workers' representatives so that it may be kept aware of changing attitudes and problems of employees.
- 2. Management must see that the foremen and supervisors understand and carry out the terms of the agreement.
- 3. Management should not shortcircuit union representatives or undermine the union's authority. Any policies or proposed programs involving the workers should be taken up with union representatives before they are made effective.
- 4. Management should give unions credit for the accomplishment whenever circumstances permit.
- 5. Management should avoid paternalism and strive to treat union representatives and their employees as equals.
- 6. Many of the restrictive practices and what appear to be unreasonable demands of the union will disappear if management will strive to give its employees regular employment.
- 7. Management should maintain adequate employee records.

*For Union:*

- 1. The union should see that its members understand the terms of the agreement.
- 2. The union should assume the responsibility to see that its members live up to the terms of the agreement.
- 3. Union representatives should make themselves available for conferences when they are requested by management.

### 3. Personality Considerations in Collective Bargaining

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*Arthur W. Ayers*

Reprinted from *Journal of Consulting Psychology*, 1944, 8, 144-153, by permission of the author and of the American Psychological Association, Inc. It is the author's thesis that misunderstanding between the respective parties in collective bargaining arises from the failure of each to comprehend the personality pattern of the other. An analysis is made of the personality of the working man, of the manager and of the third party in collective bargaining.

Surely a major lack of understanding and possibly the only significant misunderstanding between the respective parties in collective bargaining arises from the failure of each to analyze and attempt to comprehend the personality pattern of the other. In the customary attempt to settle their grievances between themselves, labor and management usually arrive at an understanding of the issue and the respective position of each party. While disagreement may persist and the issues be carried to mediation, conciliation or arbitration, rarely can the disinterested party charge the disputants with either naive or purposeful misrepresentation of the problem. But frequently during all these stages of bargaining there is mutual misunderstanding of the principles, tactics, and general behavior pattern, each of the other. It is this area of conflict that comes to the attention of the community or nation. It is here that recriminations are hurled and bitterness is bred.

Misunderstanding arises in part from a complete change in the personality of the working man and the lack of recognition of this change on the part of the manager. Also to be considered is the general belief of the employee that the entrepreneur will forever be the "Bourbon" that he always has been. Until the industrial manager is able to accept and explain the behavior characteristics of the Union officer as well as he is able to comprehend the caprices of his favorite riding horse there will be industrial strife. Moreover, until the Union officer is able to credit the manager with other than ulterior motives for his overt acts, labor-management conflict is inevitable.

An attempt is made herein to record some of the personality manifestations that will be observed by the student of collective bargaining. Wherever possible a further attempt is made to distinguish between personality characteristics attributable to the employee as a distinct individualist and those more typical of a group personality as they conform to the institutional ways

of his organization. The demarcation is always difficult and at times wholly illusory.

Management, on the other hand, has not yet attained that stage of development where its group characteristics have become an important factor in collective bargaining. True, there are some early indications of collective management and industry-wide bargaining but the large majority of employers still retain their individual identity in this respect.

**Part I. The Personality of the Working Man.** Where it is necessary to substantiate a point by analogy or allegory, poetic license is taken to reproduce the incident as it occurred, insofar as possible.

On the morning of December 24, Joe sat dejectedly in the office of the personnel manager. The physical evidence of a "hangover" was quite apparent and he was filled with remorse as he related the following story:

Yesterday was pay day and he had worked overtime until ten o'clock last night. On his way home he had stopped at a local "pub" in the spirit of the holiday season, and to relieve his tired feeling. Instead of getting one drink, as he intended, he had many and in the course of the evening a rather well-known "lady" joined the party. He spent the night with her and had either spent all his money or it had been stolen—at any rate it was gone. Without it there was no Christmas in store for his family. "Could he have an advance on his next pay?"

The personnel manager knew that Joe was sincere, that he was not a "frequenter," and that help was merited. He arranged for the advance, accepted Joe's grateful thanks and thereby dispatched the first order of business on his schedule for the day.

Two weeks later, on the morning of January 6, Joe appeared again in the office of the personnel manager, this time with an air of confidence. As union shop committeeman, he corroborated the grievance just presented by one of his fellow workers concerning working conditions within the plant. He further condemned the company for its apparent disregard for the welfare of employees.

Production and personnel supervisors can duplicate, by the score, their own similar experiences. These experiences run the gamut from granting the stenographer an early quit on Saturday and then having her complain on Monday that the starting hour is too early, to the more spectacular cases like Joe's. These same management people tell their stories with mixed emotions, some simulate the wounded animal, others the "can't understand" attitude, and a considerable number mold their viewpoints from the "ungrateful, illegitimate male offspring of a canine" angle. Young executives, especially, are deeply moved by these experiences and too often fail to search for causative factors.

The more completely the working man is able to dissociate these two aspects of his behavior the more confused or recalcitrant his employer be-

comes. Incidents thus indicative of the "split-personality" of the employee are quite commonplace in collective bargaining and certainly have no connations within the realm of abnormal psychology. If the "Joe" in our example were asked to select a motto it would closely approximate Emerson's "consistency is the hobgoblin of small minds."

Is he then a proven ingrate? We ask our personnel manager whether Joe's gratitude ended at the original interview and we are surprised to find that it has not. On several occasions he has gone out of his way to privately express his appreciation; he has volunteered gratis service in charitable work about the plant; he is a worker on War Bond subscriptions and is otherwise helpful to the personnel manager in his activities. What caused him, on the one hand, to solicit and accept management's help for his individual welfare, and on the other, to vociferously denounce the company's disregard for the welfare of its employees?

Where management has clearly recognized this dichotomy and has planned industrial relations to give expression to both phases of his personality, something closely akin to industrial peace has been attained. Joe has been an individualist in the industrial situation from the time of the "guild." The collective side of his industrial personality is relatively new and it has been chiefly within the past decade that the working situation has conditioned him to respond to stimuli of a truly collective identity. These individual and collective stimuli, however, are not of equal potency in the industrial situation today. The working example demonstrates the relative power of each.

Joe was faced with the task of having to crusade against the management's callousness after personally benefiting from its benevolence. The easy way out would have been for him to have withdrawn from the issue and let a fellow employee sponsor the group cause. As it developed, however, the collective stimulus was stronger, his individual personality was sublimated and Joe made the more difficult choice.

This conflict of motives is encountered by most wage earners, and the speed of resolving such issues is slower and more crucial in the new employee or with the older employee who finds it necessary to make a major choice like Joe's. As the new employee becomes better adapted to his working environment or when the older employee experiences choices of less emotional intensity (which comprise a large majority) the speed of resolving these difficulties is greatly increased until finally the adjustments are made with apparent ease and the area of conflict becomes greatly diminished. Where management has recognized this condition by providing for responses of either type, this same area of conflict ceases to exist. Without this understanding the manager is continually troubled by the alacrity with which the dual personality manifests itself. It is these very qualities of alacrity and equanimity which bring forth the harsher term, the "two faced" character, of the industrial personality and which are so disconcerting to management.

Since the wage earner has found expression for the "collective" side of his personality largely through the medium of labor unions, one segment of management decided that freedom from industrial conflict therefore is attained through emphasis on dealings with collective groups of employees, creation of elaborate labor relations departments, and "modernizing" and "streamlining" the grievance machinery. Collective groups in return have been prompt in recognizing this emphasis and have responded with more and varied grievances and problems concerning collective bargaining. They have made the natural response to the creation of elaborate labor relations channels by keeping these channels flooded with commerce. This same segment of management has loosely discounted the individualistic side of Joe's personality, believing, of course, that a complete and ultimate mode of satisfaction has been provided. Since there is little or no outlet for these motives, he compensates by doubling his efforts to find expression on the collective side.

Unfortunately, another segment of management has devoted all its efforts towards thwarting the collective motives of the industrial personality. Techniques for accomplishing this objective are as varied as the breadth of the "labor-baiting" term used to describe them. Industrial strife resulting therefrom has, in all probability, already been overemphasized by the press, radio and other public channels. Certainly Joe's reactions and methods of retaliation are not properly within the sphere of complex research and might better be interpreted by the layman's "common sense."

Of considerably more importance, psychologically, is that rare segment of management which has had temporary success in establishing an "escape mechanism" for resolving Joe's conflict. Basing their industrial relations on the theory that all employees want to become industrial tycoons, these employers have succeeded in keeping all collective motives in a temporary vacuum. They have devoted major efforts toward preserving and enhancing the pristine splendor of Joe the Individual. Personnel practices in this instance are not used as therapeutic devices but are chosen and initiated only when management is convinced of their value as insurance. Insurance against the collapse of paternalistic policies and assurance that the Union will be kept out of the industry or at least decimated in its effort to secure a foothold. One very effective measure is the maintenance of wage levels and standards of working conditions well ahead of unionized industry. Of course, there are other techniques such as turkish baths, paid vacations in Florida and Canada and still others which indulge Joe's fancy to an extent bordering on the burlesque. At the best they prove nothing more than delaying actions. The "frills" of personnel practice described above, fall of their own weight largely through economic pressure; while high wage levels and working standards only await the day when it is no longer economically sound to

preserve the differential in the face of rising standards among unionized industries.

In some cases these delaying actions have been augmented by geographic location which renders Joe somewhat naive or perhaps equips him with anti-gregarious tendencies. But, historically, there is ample evidence that this distinction is largely temporal.

In the interim while this unilateral development of the working man's personality is in progress, he has not completely repressed his urge for attaining certain goals through collective action. He lacks that element of security which collective bargaining contracts seem to provide and except through his own initiative has no redress from instances of favoritism and other petty annoyances of his industrial situation. These, he is able to rationalize somewhat through observance of the apparent satisfaction of his own immediate group and lack of tendency for collective action. Not so easily rationalized is the disapproval of the mass of organized labor on the periphery. Nor is he able to completely refute the taunt of organized labor that he is riding the crest of a wave caused by their own upsurge.

When in the final analysis employees effect collective action after thus being nurtured as individuals, the net effect on industrial peace is chiefly in proportion to the employer's ability to accept the transition. It can be just as difficult of attainment as if he had used "labor spies," "finds" and other drastic measures to thwart unionization.

No attempt will be made at this point to integrate the various aspects of the industrial personality presented thus far. Such integration is reserved for Part IV—Collective Bargaining Hygiene.

**Part II. The Personality of the Manager.** If all industrial managers were to become psychologists, mechanistic psychology would dominate the science by sheer number of its adherents. If individual or group behavior in the industrial situation were purely mechanistic, labor relations and collective bargaining would scarcely attract as much public attention as the repair and maintenance of industrial machinery. The public would certainly know a great deal less about "portal to portal" pay than it would about the "Catalytic Cracking Process." This would obtain because a preponderance of managers would then become as skillful in labor relations as they are in manufacturing processes. In fact, the manager would be quite adept at solving his labor problems by the derivation of formulae involving the proper number and proportion of stimuli to produce a response or series of responses of given effect.

It is a singular weakness of management that it has had so little success in combining in one individual, essential knowledge of the process and skill in handling labor. Skill in planning, scheduling flow of materials and devising short cuts in manufacture, are of little avail to the manager who is unable to maintain employee productiveness at least on a level with competitors. Too

often among managers there is either the complete inability to comprehend the change in personality expressions of the employee over the past fifteen years, or the deep suspicion that Joe has acquired a "false face" which will be cast aside at the industrial "millennium." This lack of perception is not enhanced where the manager has been trained in the exact sciences.

One such manager, high on the supervisory ladder of a well-known company, explained how some of his technically trained subordinates were just completing a course in employee relations and labor-union dealings. He further stated with some misgivings that a considerable number were not applying the new found techniques with desired results but confidently proclaimed that these same individuals would be "put through the course again." His belief in repeated vaccinations, until a "take" was obtained, is not unique in industrial circles. Practically the only assurance that the short course salesman needs to give under present day conditions is that "something new has been added." This belief in palliatives as an escape mechanism can be far more harmful to the industrial relations of a company than is generally recognized because it postpones real constructive action while employee relations are steadily deteriorating.

The same difficulty of discovering executive or administrative talent among scientifically trained men will be found at the college and other institutional levels where again many bad compromises are effected.

Another integral part of the personality of management is the industrial relations or personnel manager. His is the task of molding management policies with respect to employee relations, of retraining attitudes of both employer and employee where the need exists, and of maintaining good relations once a common ground for exchange has been established. In this latter capacity he is the bridge across which the majority of employer-employee commerce moves. Personnel men are recruited from a great variety of occupations and such viewpoints as are formed from prior work experience are consequently widely divergent. Probably the greatest single group with a common occupational background are those who have risen from the ranks of supervision.

It can therefore be seen that it is quite possible for a company to retain incompatible labor handling philosophies after the establishment of alleged modern methods for improved relations, in a personnel department.

The vestiges of another era when an attempt was made to politicize industrial relations still work to the detriment of the field. This was the period when success in personnel administration was gauged by the ability to convince a given hierarchy concerning such success. Ramifications of this device are rightfully in the realm of politics and do not merit other than acknowledgement of an additional compensatory mechanism.

Perhaps the greatest single task of the industrial relations manager is in the re-design of employer-employee attitudes. On the employer's side he is

confronted with evading devices such as have already been described plus some additional ones which deserve attention. Attempts to commiserate with employers in such matters as usurpation of management's prerogatives by employees will quickly affect rapport but the same difficulty will be experienced as the clinical psychologist meets in trying to divert a hysterical personality from completely dominating the interview by a discussion of symptoms. Even after the employer gains an understanding of certain of his faulty attitudes towards employee relations, there is the difficult job of getting him to take positive corrective action. The construction of logic-tight compartments in this direction sometimes borders on the ingenious.

An industrial relations manager through two years of painstaking effort finally was able to get the executive vice-president of his company to the point where he offered self-criticism and further admission that top executives had not used their best discretion in a certain phase of employee relations. In the final interview, with this same executive committee present, he reiterated his views and stated that the corrective measures proposed by the personnel manager would be carried out. "But," he added, "since we are completely occupied by manufacturing problems and cannot devote our time to this effort, it will be up to the industrial relations manager to see that his ideas become policy."

It is essential that all personnel managers counteract any tendency by management toward implicit belief that the creation of a department for handling employee problems will of its own weight effect desired changes. Otherwise, the ultimate shattering of this mistaken faith will result in the emasculation of the best of personnel programs.

The formation and training of the manager's individualistic personality has its roots in antiquity and has been "stamped in" by centuries of unchanging mores and institutional ways of his group. Until the employee group asserted its collective strength, the manager's success was measured by his ability to coerce behavior by whatever means he could summon. The rise of collective strength among employees has restricted his available means to coerce behavior, but the criterion for success has not changed. Where perhaps he was formerly able to maintain discipline by beating the "hunkies" or perhaps cut labor costs by methods bordering on swindle he must now be prepared to defend disciplinary action and meet competitive prices by technological improvements, employee incentives and discovery of simplified work methods. Seniority is oft times a meaningless term to him because he may have to compete with the "boss's" son or young college trained men. The "quitting" whistle only serves to remind him that he is not half finished with his "day's" work. Time and one half, double time, are all included in his monthly salary which has already been frozen by government regulations. His mistakes are usually costly and he has no union representative to defend

him before the Board of Directors. To him, tenure of office is predicated on his own efforts.

These factors are all ingrained in his industrial personality and challenge the best efforts at the process of retraining in employee dealings.

To complicate his attitudes he frequently comes in contact with the quasi-democratic principles of certain managers of collective bargaining groups. During the bargaining process when agreement between the parties is in the offing, the union manager may indicate that it will be necessary to get the endorsement of the membership. More disconcerting, however, are points of disagreement in the bargaining process about which there is the feeling on the part of the manager that the union representative is not truly presenting the position of a majority of employees. Again the necessity of consulting the membership may be presented. What is actually meant by the membership in both cases is the active participating group which may comprise as little as 2 per cent of union employees. Where this condition obtains, a repudiation of the union manager is highly improbable.

Apathy among a large portion of the membership is not uncommon in collective bargaining groups. In some instances it may be occasioned by basic distrust of management coupled with a disgust of somewhat less emotional tone which is directed toward active union participation. These employees are union members because it is the lesser of two evils and also because they do not wish to incur the disapproval of their group. In test cases this portion of the membership will usually sustain its officers as the less negative valence although predictions in this direction have a large probable error.

Another reason for ennui among union members can be traced to organizing activity wherein the collective phase of the worker's personality had not developed to the extent where he would accept full responsibility for collective action, but the threat of group disapproval was the deciding factor. The popular expression for this condition is that the membership was "oversold," whereas the opposite of this condition is true.

Where unscrupulous union leaders have perpetuated themselves and their policies by nurturing this condition they set a poor example for any change of attitude on the part of management.

The majority of unions, however, recognize it as a problem where it exists and have already made some attempt to foster a more democratic system. Among these attempts at corrective measures there is one method which should be mentioned here. It is aimed at stimulating recall of the unbearable conditions in industry before the workers organize and by subtle inference serves to admonish them that retrogression is quite probable among complacent unions. The medium for conveying these warnings may sometimes be in the nature of a manual of instruction to employee representatives of the union, in which case the bargaining power is stressed by careful recounting

of employee gains since union organization. To the employer this device is reminiscent of the days when the collective bargaining group was organized and emotions ran high. Closer unity is herein coerced by the mistaken belief that the only way to preserve union strength is to preserve the organizing spirit of combat. Such tactics invariably delay the time when the bargaining parties can sit around the table and settle their differences without resorting to recriminations. It is a period in the development of labor relations which is still removed from that ultimate goal where mutual respect for the integrity of the parties governs union-management meetings, where union employees have complete confidence in their representatives and where management can plan its operations with some degree of certainty.

It has sometimes been said that in the collective bargaining situation an effort should be made by the parties to explore thoroughly the area of agreement before considering the points of disagreement. This is founded on the belief that a majority of differences are illusory and will serve the purpose of constricting the field of dispute. This postulate serves to bring into focus an important characteristic of this phase of labor relations. By the very number of grievance meetings concerned with small groups or individual employees the area of difference is necessarily constricted and the bargaining process is essentially concerned with that area of the frequency polygon which is removed several standard deviations from the mean. There are periods, of course, like general wage negotiations or renegotiations of the employee contract where conditions affecting the whole membership are discussed, but here again the union chooses to dispatch with points of agreement and concentrate on differences. The collective bargaining agency is considerably more concerned with such minorities of dissatisfied members as may exist.

By way of conclusion, this paper has discussed the attitudes of production and of union managers and their constituents in order that an appreciation may be obtained for the scope of necessary retraining where the need exists.

**Part III. The Personality of the Third Party in Collective Bargaining.** Since the average citizen, the general public, or whatever term should be applied, is the newcomer in the field of collective bargaining, the treatment of his personality will be necessarily brief. All points concerning this neophyte are made with the same reservations as in predicting the adult personality from observation of the adolescent. He appears in the field of management-union relations when an impasse is reached and may be in the role of an arbitrator, mediator, conciliator or one of the major branches of government. It may be claimed that he is not a novice, especially in his role as arbitrator. While it is true that an early beginning was made in this field, its history is largely one of arrested development until unionization became a potent social force.

As a supposedly disinterested party the arbitrator is not without personality conflict, and his efforts to repress certain desires are not always successful.

He almost constantly finds himself in the midst of a complicated pattern of valences. As a consumer, he is frequently interested in the economic aspects of a labor dispute. The outcome of the controversy may also have political implications which would be of considerable importance to him. These and other potent social and economic forces do not contribute toward disinterest.

His ability to coerce behavior is definitely limited and where success has been recorded it has largely been accomplished by disciplinary measures or threat of symbolic danger. Concessions such as the "no-strike pledge" have been won by voluntary acceptance of the symbolic danger which is associated with the exercise of certain privileges in wartime. Active resistance to economic measures has again been restrained by the symbolic danger of inflation. He has learned that there are certain phases of the worker's personality which are greatly resistant to change. He has tested the power of his absentee leadership through propaganda, sometimes with bitter rebuke, for example, "I will fight and die for Old Glory but never 'scab' for it." These are only a small portion of his adolescent manifestations in the field of union-management relations.

There is furthermore an inherent danger to the whole collective bargaining structure to the extent that the third party can become the escape mechanism whereby an honest effort to settle differences will be foregone in favor of absentee settlement of the dispute.

At the risk of rationalization, it is the writer's belief that the youth and vigor of this third party to collective bargaining has manifested itself with ameliorating influence at a time of crisis in industrial relations; that management and labor now have discovered ample proof that they are best fitted to arrive at a settlement of their differences; that the third party will not attain maturity in collective bargaining but will regress as in the case of several democratic countries with a longer history of unionization than ours; and, finally, that the regressed form will be in the nature of mediation which will protect the public interests by "tendering its friendly offices" to find some basis for agreement between the parties.

**Part IV. Collective Bargaining Hygiene.** An effort is made here to answer some of the preceding criticisms and to set forth certain conclusions which are presently considered to be good bargaining practices.

*A. Importance of Proper Emphasis on Collective Bargaining in the Organization of the Personnel or Industrial Relations Department.* Bargaining units rapidly perceive the degree of emphasis which management places on their activities. In the period immediately following the organizing phase of unionization it is generally good practice to make this activity the major function of the personnel division. As more amicable relations are established and the constructive phase of bargaining is attained, labor relations should be consigned to their proper sphere possibly on a par with other major activities, for example, safety, employee selection and training, research,

etc. There is a strong tendency for perseveration, once overemphasis is established, and where management fails to meet this challenge the balance of the personnel program has been jeopardized.

*B. Re-design of Employer-Employee Attitudes.* The result of this activity is the barometer of labor relations. It is measured by the ability of the person charged with formulation of labor policy to:

1. Obtain for management an understanding that even though the individualistic approach to settlement of industrial problems has been largely discarded by the employee, it is possible for the manager to deal on a collective basis without sacrificing his philosophy of the way that management should function.

2. Recognize the principle that the employee still retains pride of workmanship, desire for recognition, ambition and many other individualistic traits to which expression must be given. The complete program provides for these as well as collective outlets. Patience is surely a virtue in allowing the employee time to view his new-found collective power in its proper perspective.

3. Make use of every opportunity to bring constructive bargaining tendencies of management to the attention of union managers and their constituents. This will greatly discourage union policy domination by a few and impress upon the entire membership the need for exercise of their democratic responsibilities.

*C. Complete Communications System.* There is nothing quite so humiliating to the foreman as to be informed of collective bargaining decisions by a union employee. It is essential to the maintenance of proper morale that all decisions, involved in the bargaining process or labor policy, be cleared promptly from top management to the first line of supervision.

*D. Coordination of the Various Branches of Management.* This is an elementary procedure which, if disregarded, can make management appear ridiculous in the bargaining situation, especially where a third party is included. The company's position in any issue is greatly weakened if autonomy of its subdivisions interferes with this process. All pertinent facts, sometimes from research to sales, should be collected and integrated before bargaining is initiated.

*E. Management's Prerogatives.* A most controversial issue in collective bargaining, but one which must be reduced to a degree of common understanding among all management representatives if their respective dealings are to be effective. Where the foreman is ignorant of such matters, the first step of the grievance procedure (between the aggrieved employee and his employer) becomes a vacuum.

*F. Collective Bargaining and "Horse Trading" Are Not Synonymous.* "Horse trading" popularly implies that one of the parties has made a bad bargain. This is what usually occurs unless the ramifications of each issue are not fully examined. Collective bargaining implies that one of the parties agrees to forego the attainment of a certain goal in order to realize another of greater significance. Without proper consideration, the concession may

become self-inflicted punishment and the alleged gain an hallucination. In this respect there is the frequent charge by one of the parties that the other is guilty of practices closely resembling those of Shylock, whereas it usually develops that someone has failed to comprehend the full intent of the agreement.

*G. Resort to Aid of the Third Party Only When Agreement Is Otherwise Impossible.* Preferably, the parties should exhaust all the possibilities of agreement, then start from the beginning to re-examine the issues. Rarely can the disinterested party be as conversant with the dispute as the ones immediately concerned. The third party makes the decision but the disputants must "live with it."

#### 4. The Arbitration of Industrial Disputes Arising from Disciplinary Action

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*J. M. Porter, Jr.*

Reprinted from *Proceedings of the Second Annual Meeting*, Industrial Relations Research Association, by permission of the author and The Industrial Relations Research Association. A statistical and psychological analysis of 197 arbitration awards in which the issue was the equity of discipline imposed upon individual employees for behavior which management deemed detrimental to effective operations.

The present paper reports on an initial study of industrial disputes arising from disciplinary action which have been taken to arbitration. Our interest in this area arises from the question as to the effect arbitration of such disputes has upon management's effectiveness in maintaining discipline within the plant. We have not as yet found the answer to such questions but our study of nearly 200 arbitration awards has revealed some pertinent information about the behavior of the parties involved.

**Analysis of Arbitration Awards.** The material selected for initial study consisted of 197 arbitration awards in which the issue was the equity of the discipline (suspension or discharge for the greater part) imposed upon individual employees, for behavior which management deemed detrimental to the effective operation of the plant. These awards were all those involving the arbitration of disciplinary disputes reported by a leading industrial relations reporting service during the years 1946 and 1947.

A wide variety of production and service industries were represented. In

only a few cases did the discipline administered apply to more than a single employee. Sixty-eight different individuals served as arbitrators and the median number of awards per arbitrator was slightly more than one.

In 74 cases, which represent 38 per cent of the total number studied, the arbitrator's award sustained the disciplinary action taken by management. In the remainder of the cases studied, 121, which was 62 per cent of the total, the effect of the arbitrator's award was to either revoke or modify the discipline imposed by management. In this latter group of cases, the effect of the award was to completely revoke management's action in 49 per cent of the instances and to modify (i.e., reduce in severity) the discipline in 51 per cent of the instances.

Where the original discipline had taken the form of a suspension (24 cases) the arbitrator's decision sustained the action taken in two-thirds of the instances. Where the original discipline imposed had been the discharge of the employee (170 cases) the arbitrator's award sustained the action in 34 per cent of the cases. Within the limits of the cases studied, there appears to be a definite tendency for the arbitrator to modify the discipline imposed by management. However, when suspension rather than discharge is involved, the awards sustain management's actions two to one.

Our figures show that discharge is the form of discipline most frequently resorted to by management. It must be borne in mind, however, that our data were gathered from disputes which had been taken to arbitration and such findings may merely mean that unions are more apt to press discharge cases to arbitration than lesser forms of discipline.

We next attempted to formulate the categories of employee behavior which evoked disciplinary action. We first listed all the forms of behavior cited by management at the arbitration hearing in substantiation of its actions. In some cases more than one form of behavior on the part of the disciplined employee was cited. Where this was the case and the company's argument dwelt at any length upon more than one kind of behavior as contributing to their decision, the cases have been classified in as many categories as were appropriate. Where the bulk of the company's argument was confined to the fact that the employee's behavior had been of one kind, the case was of course classified under a single heading. We find that four categories of behavior are sufficient to classify all but a very minor number of cases.

Attention is now called to Table I.

*Violation of Shop Rules* was cited 59 times. This is 28 per cent of the total citations. Into this category we have classified such forms of behavior as intoxication on the job, tardiness, fighting with co-workers, gambling, dishonesty, excessive absenteeism, absence without proper notice, and failure to report for work when scheduled.

When the reasons cited by the company for the discipline imposed were violations of shop rules, the arbitrator's award sustained management in 45

TABLE I

Violation of Shop Rules		Incompetence and/or Inefficiency		Insubordination		Violation of Contract	
Cited 59 (28%)		Cited 41 (20%)		Cited 55 (27%)		Cited 42 (21%)	
Mgt. Sust. 45%	Discip. Mitig. 55%	Mgt. Sust. 32%	Discip. Mitig. 68%	Mgt. Sust. 40%	Discip. Mitig. 60%	Mgt. Sust. 31%	Discip. Mitig. 69%
Revoked 39%	Pen. Reduced 61%	Revoked 68%	Pen. Reduced 32%	Revoked 51%	Pen. Reduced 49%	Revoked 37%	Pen. Reduced 63%

per cent of the cases and mitigated the discipline imposed in 55 per cent of the cases. In dealing with those cases in which the effect of his award was to mitigate the discipline imposed, the arbitrator completely revoked management's action in 39 per cent of the cases and acted to reduce the severity of management's penalty, in 61 per cent of the instances.

*Incompetence and/or Inefficiency* was alleged by the company in 41 cases as the reason for discipline. This represents 20 per cent of the total citations. Into this category we have classified behavior described as an uncooperative attitude, carelessness, negligence, conducting personal business on company time, and the general statement that the employee was incompetent or inefficient on the job, or both.

In such cases the effect of the arbitrator's decision was to sustain management's action, *i.e.*, find that sufficient cause existed, in 32 per cent of the cases. In the remaining 68 per cent of the cases, in which the effect of his award was to mitigate the discipline, the award had the effect of revoking it completely in 68 per cent of the cases and of finding that cause for discipline existed but that the action taken by management was too severe in the light of the apparent facts in 32 per cent of the instances.

*Insubordination* was cited by the company in support of the discipline administered in 55 instances. This represents 27 per cent of the total citations. In addition to the general statement that the disciplined employee's behavior had been insubordinate, such specific acts were classified as representing insubordination as: fighting with the supervisor, friction with the foreman, use of profanity in arguing with the boss, and refusing proper work assignments.

When insubordination was cited as the reason for the discipline administered, the effect of the arbitrator's award was to sustain management's action in 40 per cent of the instances and to mitigate it in 60 per cent of the cases. In the latter instances, *i.e.*, the cases in which the arbitrator mitigated the discipline imposed, the arbitrator completely revoked the discipline almost as frequently as he indicated that he felt some penalty was merited but that the penalty assessed by management was too severe.

*Violation of the Labor-Management Agreement* (the contract) was given as the reason for discipline in 42 cases. This represents 21 per cent of the total number of citations. Such behavior as interference with the direction of the working force, engaging in work stoppages and slowdowns, coercion and solicitation of workers to join the union on company time and property, and refusing to follow the grievance procedure as set forth in the agreement were classified as violations of the contract.

When violations of the labor-management agreement were cited as meriting the discipline imposed, the effect of the arbitrator's award was to sustain management in 31 per cent of the instances and to mitigate management's action in 69 per cent of the cases. In those cases where the effect of the

arbitrator's decision was to mitigate the discipline imposed, the action of management was completely revoked in 37 per cent of the cases; in 63 per cent of the instances the arbitrator indicated that he felt some discipline was merited but that imposed by the company had been too severe.

Only four per cent of the cases cited grounds for discipline which could not be classified under one or the other of the four categories just described.

**Summary of Statistics.** In summary, our study has indicated that arbitration sustains management's imposition of discipline in approximately 40 per cent of the cases and mitigates the discipline imposed in approximately 60 per cent of the cases. The behavior held most frequently by management to merit discipline was:

Violation of Shop Rules which accounted for 28 per cent of the cases.

Incompetence and/or Inefficiency which accounted for 20 per cent of the cases.

Alleged Insubordination which accounted for 27 per cent of the cases.

Violation of the Labor-Management Agreement which accounted for 21 per cent of the cases.

Violation of shop rules and insubordination are cited as reasons for discipline with slightly greater frequency than incompetence and/or inefficiency and violation of the labor-management agreement.

Our analysis shows that the arbitrator's award mitigated the discipline imposed most frequently when the behavior cited as meriting the discipline was incompetence and/or inefficiency and violation of the labor-management agreement. Discipline for violation of shop rules is mitigated least frequently.

Where the effect of the arbitrator's award was to mitigate the discipline imposed, arbitrators, when they have felt discipline was merited, have been more inclined to substitute their opinion for that of management in determining the discipline merited when violation of shop rules and violation of contract were alleged than they have been when incompetence and/or inefficiency and insubordination were alleged. When insubordination was alleged, and the arbitrator's award mitigated management's action, the arbitrator completely revoked management's action about as frequently as he decided that while a penalty was merited, that fixed by management was too severe. When incompetence and inefficiency were alleged, the arbitrator's award completely revoked the discipline imposed more than twice as frequently as deciding that though a penalty was merited, that fixed by management was too severe.

**Motivations Revealed by Case Analyses.** The study of the arbitration of industrial disputes arising from disciplinary action affords an opportunity for studying significant forms of social activity. The issues presented for adjudication permit the study of human motivations, interaction, and conflict in an atmosphere relatively free from appeals to previously established doctrines of *stare decisis* and similar forms of precedent.

It may be expected that the study of various aspects of industrial arbitration, particularly of disputes arising from disciplinary action, will reveal data with respect to human motivations which will supplement that obtained through attitude and morale surveys. In our opinion, insights gained through the study of the activities of the groups and the issues involved in arbitration have a validity which insights gained through the other methods of study lack. Arbitration is an activity in which the parties do not engage unless they feel strongly about the issues involved, and it is reached only after prior efforts by the parties themselves to settle the dispute.

We have also been interested in such insights as might be achieved into the thought processes of the arbitrator himself. This individual is coming to play an increasingly significant role in industrial relations. As the fact of their responsibility to the public has been increasingly impressed upon labor and management groups, we find increased resort to arbitration for the peaceful resolution of conflicts which the parties are not able to resolve themselves.

The behavior evoking discipline which we have classified as a violation of shop rules or that indicating incompetency and/or inefficiency apparently represents a conflict between the individual's personality characteristics and conditions established by management in order to conduct the business of the company in what is deemed an efficient and effective manner. In our experience, open feelings of hostility are not usually present in such instances and the dispute is generally a question of whether or not a violation of shop rules occurred or whether or not incompetency or inefficiency was present. And, if so, has the discipline under consideration been applied consistently throughout the plant in the past? The problem posed for the arbitrator in such cases is generally a question of the determination of the fact of the violation or incompetence and management's consistency in the application of the rules or standards which have been set up.

On the other hand, cases identified as involving insubordination and contract violation are frequently situations of open hostility and the thinking of both parties is emotionally prejudiced thereby. Where an employee is disciplined for either of these causes, the motivation behind the discipline may be at least partially a reaction to implied loss of status on the part of management—a threat to the authority and prestige of the management man. This is particularly true at the lower levels of management where most disciplinary action initiates.

The hypothesis is indicated by the fact that violations of shop rules and incompetence and inefficiency on the job seem to elicit disciplinary action more frequently when associated with behavior on the employee's part which the supervisor or foreman interprets as insubordinate. Thus there is frequently an over-reaction, by first-line management particularly, when insubordination or violation of contract—matters of status—are at stake. The discipline applied need only meet the requirements of management's responsibility for

efficient production in the plant, but, in fact, it tends to exceed this need and becomes an action mainly of vindication of status and exercise of authority.

The need for status, frequently coupled with adherence to feelings of group loyalty, also seems to motivate the union's activities in arbitration hearings. Many cases of violation of shop rules and discipline for incompetence are brought to arbitration by the union even though the facts seem clear that the employee has been guilty of the conduct alleged and no discrimination in the application of the rules or standards by management is evident. The union leadership fights the disciplinary action simply because its status with its members has been challenged and group loyalty tested. The motive of status protection is even more clearly defined in the union's defense of alleged acts of insubordination or contract violation.

These secondary motivations, status and group loyalty, play an important role in the process of arbitration of disciplinary action. By the language of the labor-management agreement the parties are concerned only with the question of the justice of the discipline imposed. Has management's action been taken for "proper or just cause"? Yet the number of instances which occur wherein the union challenges non-discriminatory discipline for patent violation of shop rules, obvious incompetence or unmistakable insubordination, and contract violation, and wherein management resorts to extreme disciplinary action in the case of mild insubordination or violation of contract, seem to indicate that the equity considerations outlined in the Agreement are not the sole motivation. A clear understanding of these underlying motivations would, we think, not only eliminate a substantial number of disciplinary disputes but significantly aid plant morale as well.

Also of value in the application of this understanding of motivation might be more frequent resort by management to suspension rather than discharge. If one views the objective of disciplinary action as the improvement of behavior, then it is clear that insofar as the individual disciplined is concerned, any value in terms of reformed behavior is lost to the company when the man is discharged. Also lost is the company's investment in the training given that man. Moreover undue discharge has a negative effect upon the other employees. Thus those instances which give rise to the opinion that discharge is invoked rather than suspension because of management's over-reaction to a threat to status, would be eliminated and the relations between labor and management would be expected to be benefited thereby.

These unspoken secondary motivations of status and group loyalty impinge upon the behavior of the arbitrator as well. The cases studied demonstrate this premise in two extremes of approach employed by the arbitrator. One criterion of judgment is to simply determine whether management has proper cause for discipline and had been consistent in the past in its application and, if so, sustain management's action irrespective of its severity. The other standard of judgment adopted by some arbitrators is, after determination of proper cause and non-discrimination, to independently evaluate the

discipline in terms of what the arbitrator considers merited and so award. Under this second point of view, the arbitrator frequently modifies the company's disciplinary action even though a finding of proper cause and good faith on management's part has been made. Our study indicates that this substitution of the arbitrator's judgment for that of management properly exercised, is more frequent in instances of management discipline for violation of shop rules and contract violation.

### CONCLUSION

We may tentatively conclude from this preliminary study that secondary motivations are of real significance in the arbitration of industrial disputes which arise from disciplinary action. That both parties are significantly influenced by considerations of status, and that the union is additionally influenced by consideration of group loyalty also seems apparent. The operation of these needs interferes with sound function of the disciplinary process and the arbitration of disputes arising therefrom. The arbitrator, in turn, often has a tendency to go beyond the authority contractually vested in him to ascertain proper cause and non-discrimination, and substitutes his judgment for that of management in determining the appropriateness of the discipline meted out. We believe that further investigation would shed worthwhile light on behavior in this field and aid in the understanding of the disciplinary and arbitration process.

## 5. The Human Factor in Industry

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*Glen U. Cleeton*

Reprinted from *The Annals*, 1951, 274, 17-24, by permission of the author and the American Academy of Political and Social Science. The author presents an over-all philosophy of the place of the worker in modern industrial society, his needs in attaining satisfaction in work and living. Special attention is given to the problem of communication between management and workers.

**The Basis of Satisfaction in Work.** A generation ago leaders in industry began to give explicit attention to problems of production efficiency. Marked progress has been made in the determination of minimal time requirements in work performance and in the establishment of patterns for the simplification and standardization of motions made by the worker in performing job operations. However, the human factors in industry over and above the

routines of job performance are frequently neglected. Consequently, the inherent challenge of work as a normal human activity is often dissipated to such an extent that many industrial jobs become dull and uninteresting, if not, indeed, frustrating.

Through methods study, involving time and motion analysis, mechanical efficiency of production has been greatly improved. Obviously, mechanical efficiency is an appropriate management objective because it leads to greater productivity and thereby benefits all consumers, including the workers who are the producers. But mere production efficiency as such is remote satisfaction to the worker because he responds to his work in terms of personalized desires and needs.

In addition to basic physical needs, every worker has certain desires which he, as a human being, seeks to satisfy to some degree in the activities of day-to-day living. Among these are: (1) the need to share thoughts and feelings with others; (2) the need for dominance—power in exercising control over persons and other elements in one's environment; (3) the need for self-determination—individuality and independence; (4) the need for achievement, acquisition, and possession; (5) the need for approbation—recognition and admiration by others; and (6) the need for ideation—realistic, autistic, projective.<sup>1</sup>

If opportunity to satisfy desires in addition to those relating to physical needs is not provided in work activities, and if the worker finds no supplementary means of giving expression to these motivating forces, feelings of frustration may develop which encourage compensatory behavior inimical to good work performance. Through the effects of frustration the worker may become sufficiently maladjusted to be considered by management as a "chronic troublemaker." To prevent worker maladjustment, management must seek the attainment of its production objectives in ways which permit the worker to satisfy normal human desires through work activities.

*Economic Emphasis.* Unfortunately, industrial organization is fundamentally economic and places emphasis on monetary rewards for work which supply only the means of satisfying physical wants and needs. Obviously, the primary purpose of the worker who seeks employment is to obtain purchasing power with which to satisfy physical needs. Furthermore, the frank purpose of the employer is to profit by the worker's efforts. Consideration of the monetary reward to the worker and the gain of the employer from such work is inescapable. However, through preoccupation with material motivation, both workers and employers frequently fail to grasp the significance of the spiritual values of work. Hence, there is often mutual failure to recognize

<sup>1</sup> For a discussion of the nature of these desires and their relation to morale and motivation see Glen U. Cleeton, *Making Work Human* (Yellow Springs, Ohio: Antioch Press, 1949), pp. 15-100.

that work should provide opportunity for individual self-realization which would contribute to the personal and social adjustment of the worker.<sup>2</sup>

General disregard for the spiritual values of work has produced numerous work relations situations in which greed is rampant, tensions are acute, and group conflicts are in daily evidence. In recent years because of disputes between employers and workers, strikes and lock-outs have been of such frequent occurrence as to indicate a distinctly unhealthy social situation—one which may explode into violence of an uncontrollable nature unless ways of producing greater satisfaction in work for its own sake are found and utilized. Furthermore, to reach the heart of the problem of human relations in industry, employers and workers must find a basis for developing mutual respect for the desires and needs of each other.<sup>3</sup>

*Mental and Emotional Considerations.* To understand problems of human relations in industry, employers must recognize that frequently tasks performed are not the most important element in work experience; that which transpires in the mind of the worker, both on and off the job, is often of greater significance than job operations in determining work satisfaction. Looking forward to promotion or advancement, considering ways of improving the work environment, overestimating the relative importance of what is being done, seeking acclaim and recognition by others for accomplishment, trying to please a boss who is admired or to be of service to loved ones, trying to achieve a sense of social contribution—mental configurations relating to these self-involved aspirations pass through every worker's mind in the daily performance of his job.

If these mental-emotional patterns are favorably toned, and if the capacity of the worker for ideation is directed into constructive channels, work can be made challenging and interesting to those who perform it. Work activities which, taken by themselves, seem dull and tiresome assume an air of liveliness and sparkle when enriched by hope and constructive thoughtfulness on the part of the worker.

As a human being, every worker consciously or unconsciously seeks a responsive social relationship with his employers and fellow employees. In this respect the worker is favorably motivated by:

1. Leadership which he can like, respect, and admire.
2. Surroundings which promote physical well-being.
3. Acceptance as a recognized member of a group.

<sup>2</sup> For a discussion of psychological satisfactions in work see "Self-Realization Through Work" in Cleeton, *op. cit.*, pp. 45-76.

<sup>3</sup> For a discussion of ways and means of making this principle explicit see Robert W. Johnson (Chairman, Board of Directors, Johnson and Johnson), *People Must Live and Work Together—or Forfeit Freedom* (Garden City: Doubleday & Company, Inc., 1947).

4. Recognition as an individual, a partner, not a servant.
5. Fair treatment in relation to others.
6. Reasonable sense of permanency.
7. Knowledge of the results of his efforts.
8. Knowledge of company plans and policies.
9. Approval for special effort or good results.
10. Respect for his religious, political, moral, and social beliefs.
11. Evidence that other workers are doing their share of total production.
12. A friendly social atmosphere in which he is considered with respect by his fellow workers and his supervisors.<sup>4</sup>

**Overcoming Dissatisfaction in Work.** When a person becomes a member of a group he is influenced by the attitudes and opinions of the group. He is affected by and contributes to the morale of the group. This emergence of morale in group relations merits careful recognition by management. From time to time and by various means, management should ascertain the attitudes of workers toward their work and should then try to determine the probable effect of these attitudes on productivity. When determined, if unfavorable, probable causes should be sought and corrective action taken. The causes most often found are poor leadership, unpleasant or uncomfortable working conditions, and opinions which conflict with management policy.

Sometimes, the sources of attitude conflict will be found to generate from strongly held views by one or more individual members of the group. When such is the case, carefully planned handling of the situation becomes necessary, particularly if the troublemakers have organized support within the group or from labor leaders outside the group.

A certain amount of dissatisfaction may be expected in any group because it is human nature to find fault. There will always be things related to a worker's job, the place and conditions of work, the worker's associates, supervision, method of wage payment, and special privileges about which there will be intermittent worker complaints. This is a normal phenomenon; in fact, a certain amount of grousing is evidence of interest in work. Perhaps the grumbler wants nothing more than an audience; perhaps he really wants nothing done nor expects that it will be.

However, when feelings with reference to specific circumstances reach the point of seeming injustice to the worker, or when it appears to him that there is abuse of control over his life fostered by the work situation in which he finds himself, he develops attitudes which result in a sense of grievance. If his feelings thus aroused are not resolved, the sense of dissatisfaction may become a controlling factor in his work performance. In turn, he may sensitize negative attitudes in other workers with whom he is associated, and, through a sort of chain reaction, a situation may arise in which tensions are greatly

<sup>4</sup> For a list of qualities of leadership in supervisors and managers to which the worker responds favorably see Cleeton, *op. cit.*, pp. 72-73.

out of proportion to the inciting elements. Obviously, the resolution of minor grievances tends to reduce the possibility of major group conflicts.<sup>5</sup>

**Establishing a Basis for Mutual Understanding.** The maintenance of harmonious human relations in industry requires that management and workers understand each other's points of view. To achieve such understanding, methods of communication must exist up and down the line through the entire hierarchy of authority in the social group which constitutes a business firm. In any company where it is taken for granted that information about policies and practices will trickle through an organization simply by being announced at the top, or that understanding arises out of mere knowledge of the existence of such information, an examination of the thinking, attitudes, and behavior patterns of workers and supervisors would bring forth surprising evidence to the contrary.<sup>6</sup>

**Differences of Interpretation.** Even where a written agreement between management and workers exists in the form of a labor contract, the parties to the agreement cannot assume that they understand each other or, for that matter, that they agree with each other simply because they have attempted to set forth their ideas in written form. An experiment in group dynamics conducted by one company clearly demonstrates this point. After long negotiations, compromises, and reconstruction of phrasing, a contract was formulated through collective bargaining in which a sincere effort was made by both sides to arrive at a workable agreement. However, since disputes had arisen during the life of the previous contract, the personnel officer of the company obtained permission to hold a meeting to discuss the application of the provisions of the new contract in terms of day-to-day operations.

Attending the meeting were representatives of top management, department heads, foremen, union officials, and union stewards. The contract was read and discussed paragraph by paragraph in relation to operations. The differences in interpretation brought to light were surprising and disturbing. In fact, the differences were so great that it appeared unlikely that mutually acceptable interpretations could be reached. However, through patient deliberations involving four sessions of several hours each, reasonable unanimity was achieved.

**Results of Intergroup Discussions.** Important conclusions may be drawn from the foregoing example and other instances of intergroup discussions:

1. Without being aware of differences in understanding until a crisis arises, top management and its supervisory staff may differ with each other on the

<sup>5</sup> This thesis is developed in greater detail in an article by the author entitled, "Strikes Can Be Prevented," *Personnel*, Vol. 27 (July 1950), pp. 80-82.

<sup>6</sup> For an expository treatment of the concept of the business firm as a social organism and illustrations of the operation of intergroup communication see Burleigh B. Gardner and David G. Moore, *Human Relations in Industry* (Rev. ed., Chicago: Richard D. Irwin, 1950).

interpretation of labor contract provisions, management policy, and operating practices unless mutual understanding and agreement are reached through group discussion.

2. Management and its representatives may differ with union officials and their agents on the interpretation of matters already agreed upon in substance unless these are discussed in the light of possible application.

3. Although the cleavage at the outset of intergroup discussions usually places management and its representatives on one side and workers and their representatives on the opposite side, continuation of the discussions brings a realignment of groups, which paves the way for mutual understanding.

4. Through discussions by groups of nonhomogeneous interests, clearer understanding can be attained and a basis for more harmonious intergroup relationships can be established if such discussions are conducted on a level of mutual respect.

5. Intergroup discussions including different authority levels in a company frequently become a sort of arbitration in advance of dispute, thereby forestalling the development of conflict.

6. Even though issues are not always settled through intergroup discussions, the elements of difference are at least brought to light in a manner which permits ameliorating action to be taken.

7. Collective bargaining is usually more effectively engaged in where intergroup discussions have been used as a means of solving work relations problems of a noncontractual nature.

The virtues of intergroup discussion as a technique of attaining mutual understanding suggest that it should be more widely used as a tool of human relations in industry. However, if so used, management and its representatives must acquire skill in conference leadership.

Although opportunity should be given for all participants in a conference to express views, a conference should not be permitted to become a town meeting. Furthermore, both workers and management should agree in advance that intergroup conferences will not be used as propaganda forums by any of the parties concerned. Usually the chief task confronting the conference leader is that of keeping discussions "on the beam" because the thinking of many persons participating in conferences is of the free association, rather than controlled association, type. The leader must also recognize that initially many differences are simply conflicts of desire rather than disagreement as to the facts or fundamental principles involved. To overcome this limiting element in group discussions, the conference leader should search for a point of agreement in fact or principle as a foundation on which to build a superstructure of constructive group thinking.

**Providing Adequate Reward for Work.** It is fruitless to talk about capitalizing on the spiritual values of work, adjusting work conditions to provide psychological satisfactions, or promoting mutual understanding between management and workers if income from work does not provide adequately for the physical needs of the worker and his family. But the problem of assuring

adequate rewards for work is broader than the provision of satisfactions in work; it is one of paramount social significance, because economic maladjustment of a large number of workers, if uncorrected, could wreck the enterprise system. Paradoxical as it may seem, the private enterprise system stands to suffer more from substandard wages for large masses of our population than from the allegedly high wages against which protest is frequently offered by those seeking to profit through the work of others.

Within recent years the share of the national income paid to workers in the form of wages has shown a gratifying increase. This increase is gratifying not only to recipients of the wages, but to all persons who wish to see the benefits of our industrial society widely distributed, because a reasonably good case can be made for the principle that economic stability depends on the provision of a fair standard of living for the majority of workers.

*Minimum Standards of Adequacy.* Definition of a socially acceptable standard of living for workers is extremely difficult. Furthermore, in a period of shifting wage rates and fluctuating price levels, it is even difficult to obtain reliable data on the distribution of wages on a nationwide basis. However, it is estimated that at least 25 per cent of workers have an average income of less than \$25 to \$30 per week, despite phenomenally high wages earned by members of the skilled crafts and extremely favorable rates currently being paid to workers in many mass production industries. Probably no one conversant with the economics of family living would argue that an average family (three persons) could meet more than subsistence standards on an income of less than \$50 to \$60 per week. If this assumption is a reasonable one, then at least one-third of American families are trying to live on substandard incomes.

In those private enterprises which pay substandard wages, it seems safe to assume that much could be done to provide a higher reward for the worker through the elimination of waste, and by more intelligent and resourceful management of production and marketing. To assert, as some representatives of management do in these laggard industries, that wage increases above substandard levels would put them out of business is, of course, a debatable contention. Efforts of the past half century have proved conclusively that lifting wages did not destroy wholesale trade, coal mining, the steel industry, or other industries concerned with the production of electrical goods, automobiles, heavy machinery, printing, petroleum, rubber, and power and light.

*Merit Differentials.* In many industries management has sought to apply the principle that merit in job performance should be rewarded in wage differentials, preferential employment, and upgrading of the individual worker. In applying this principle, it has become evident that there are fundamental differences in the capacities of human beings, as well as differences in the degree to which capacities will be exercised by the worker. Management has sought to measure capacities before employing the worker, has sought to instill in

the worker methods of operation which fully utilize his capacities, and has established schemes of differential reward for productivity and general job proficiency.

The techniques employed by management for measuring capacity, training in job performance, and applying incentive rewards have frequently been opposed by workers and their labor organizations. Sometimes this opposition has been based on a difference in philosophy between management and labor leaders, but more often conflict on these issues arises out of misunderstanding primarily due to failure of management to communicate to the worker the reasons for, and the nature of, these techniques. Most workers are not opposed to efficiency of production and variation in individual reward. However, many conflicts arise out of inept attempts by production expediters to attain high production standards.<sup>7</sup>

Providing an adequate reward for work is a twofold problem. In the first place, it is one of general social responsibility for lifting the lower third of wage earners to a real income level which will permit living on a socially acceptable standard of human dignity and decency. In the second place, it is one of individual company responsibility for rewarding merit and encouraging individual initiative. These objectives cannot be achieved (1) if productivity is restricted by incompetence of workers, union policies, inadequate production engineering and research, or limitations of management; (2) if an excessively large share of the worker's income is absorbed by taxes; or (3) if national fiscal policy fosters price fluctuations which destroy the purchasing power of wages.

**The Control of Tyranny in Human Relations.** Despotism in industrial relations has existed in a variety of forms in the past, and continues in evidence in present-day work situations to some extent. The early history of industrial expansion is replete with examples of dominative exploitation of the worker by the employer for the purpose of accumulating capital. This exploitation brought about mutual co-operation by workers to resist domination through the formation of unions. However, in the development of worker organizations dominating personalities have emerged, and in some instances the worker finds himself and his actions controlled with a degree of absolutism considerably beyond that which would be endured if he were given freedom of choice.

To a considerable extent, social gains by workers as a group have been accompanied by insistent propaganda designating capitalistic tyranny as the foe of labor, and the philosophy of the worker-supreme has been offered as

<sup>7</sup> For statements of labor's views on this question see: William Gomberg, *A Trade Union Analysis of Time Study* (Chicago: Science Research Associates, 1948); Clinton S. Golden and Harold J. Ruttenberg, *The Dynamics of Industrial Democracy* (New York: Harper & Brothers, 1942); Morris L. Cooke and Philip Murray, *Organized Labor and Production* (New York: Harper & Brothers, 1940).

the antidote to capitalism. However, in those countries where this philosophy has been carried to its ultimate conclusion, despotism equally as destructive of individual freedom as any other form of political, social, or economic tyranny has been practiced by cliques using the worker as a symbol.

Despotism is abhorrent to the democratic philosophy, whether practiced by entrepreneurs, labor leaders, or government officials. Consequently, means of softening the effect of tyranny have been sought through restrictive and directive legislation. Doubtless mutual good will can accomplish more than legislation in establishing social patterns of democracy in industrial relations. However, public opinion appears to demand further experimentation with labor-management legislation in the hope that a socially acceptable formula for human relations in industry can be established.

### CONCLUSIONS

From a human relations point of view, the true measure of good industrial relations is the extent to which the sense of human dignity is preserved and individual initiative is promoted. To this end workers must find satisfaction in work, both physical and psychological; but psychological satisfactions in work cannot be promoted unless provision is made for the physical needs of workers through adequate reward. Group conflict in human relations can be reduced through cultivation of mutual understanding and elimination of tyranny in industrial relations through social control.

The ultimate solution to functionally appropriate and reasonably equitable industrial relations probably cannot be found in legislation. However, it seems certain that we shall experiment further with administrative law before abandoning hope for more effective implementation. Perhaps the solution to human relations problems lies in a better understanding of social institutions on the part of the average citizen, and clearer recognition by employers and workers of the fact that each company is in itself an institution in which conflicting social forces must be brought into harmonious adjustment.

From the standpoint of the scholar interested in human relations in industry, there is need for (1) an extension of research on the question of individual adjustment and the possibilities of establishing work patterns which will bring satisfaction to the worker through the impact of his total personality in the work situation, and (2) an extension of research which will provide better understanding of the group dynamics involved.<sup>8</sup>

<sup>8</sup> Cf. Frederick H. Harbison and Robert Dubin, *Patterns of Union-Management Relations* (Chicago: Science Research Associates, 1947), and National Planning Association, case studies on *Causes of Industrial Peace under Collective Bargaining* (Washington, 1948 to date).

## 6. An Experiment in Industrial Harmony

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*Bertram Gottlieb  
Willard A. Kerr*

Reprinted from *Personnel Psychology*, 1950, 3, 445-453, by permission of the authors and of Personnel Psychology, Inc. Evidence is presented to substantiate the hypothesis that full emotional acceptance by management of the collective bargaining organization and studied effort at cooperation result in positive integration of employee attitudes.

**The Problem and Background.** What are the probable effects upon employee attitudes of complete emotional and cooperative acceptance of a union by management?

An attempt to answer this question was made possible when the authors were invited by management and union to study the situation existing at the S. Buchsbaum Company plants in Chicago. The remarkable history of this organization's labor-management relations was first reported by a University of Chicago research group (1) in 1946. That pioneering study included critical documents obtained from both labor and management, giving their respective accounts and interpretations of the struggle from strife to cooperation. The *Applied Anthropology* report postulated four representative potential types of management attitudes toward unions, and implications of each.

1. Management is determined either (a) not to recognize the union or (b) to get rid of it by any available means. This, of course, means open warfare.
2. Management accepts the union for the time being, but still wants to hold open the possibility of getting rid of it at some future date. This leads to undeclared war.
3. Management accepts the union as being here to stay, but nevertheless the executives continue to function as much as possible as if the union were not present. The union, not consulted, often simply blocks action.
4. Management accepts the union, both intellectually and emotionally. Management modifies its behavior accordingly and the union reciprocates.

In its labor-management history, the Buchsbaum Company at different periods constituted a rather clear-cut example of all except the third of the above four management attitudes. For this reason—and because each separate attitude apparently was held with sincere and determined conviction—this company's experience constitutes a crude experiment in socio-industrial psychology.

From its founding in 1888 until the late 1930's, the firm was a small family business engaged in the manufacture of jewelry; today it employs approximately 700 workers engaged in the manufacture of jewelry, rainwear, belts, suspenders, ball-point pens, and gift goods.

A union contract was signed in 1918; that union, according to Mr. Buchsbaum's statement (1), was broken in 1919. In 1935, after a long and costly strike, another organizing attempt was thwarted. Mr. Buchsbaum reports that the company, with the financial and moral support of its employers' association, used the following devices to discourage unionization during those years: scanning all employees for union tendencies and "discharging them quickly if any were evidenced"; teaching trade to "new helpers"; refusing to hire "ringleaders" in association shops; employing a "labor spy both before and during the strike." Workers responded to this attitude of management with slowdowns, breakage, stealing, and bad discipline. Mr. Buchsbaum remarks of this period, "I thought if I let the union in, it would ruin my business. It seemed to me that I was fighting for my business life. So, I felt that I was really defending my constitutional rights."

By 1940 the workers were organizing again, and this time under the protection of the Wagner Act, which forbade managerial coercion or intimidation of personnel. Management experimented with a pay raise to convince the personnel that they could get more from the company if they remained unorganized. This failed and Mr. Buchsbaum precipitated a strike by refusing to meet with Mr. Samuel Laderman, President of the International Chemical Workers Union, Local 241, A. F. of L., on the contention that the union did not represent a majority of the employees.

In a series of critical strike incidents, Mr. Buchsbaum became impressed with the strikers' respect for property and with the apparent sincerity of some of their fundamental contentions. On the second day of the strike a meeting was arranged which shook Buchsbaum's feeling that all union organizers were racketeers. Informed previously by a fellow-employer that Mr. Laderman was trustworthy, he discovered during the meeting that he and Laderman shared a love of fine music and a hatred of violence. This session ended with arrangements for Buchsbaum to confer with a committee of his employees on the next day. At the conference, in response to a question from one of the strikers, Mr. Buchsbaum explained his reasons for opposing unions, and he received some startling retorts. His basic objection was that he thought unions limited production. The workers gave him concrete examples of practical things that he could do that would save money or increase production. Convincing that the workers were concerned with the company's as well as their own welfare, he told the men to go back to work: he would sign a contract.

**Complete Emotional Acceptance of Union.** Unlike his own company in previous years and other employers who signed contracts during this period only because they were forced to do so, Mr. Buchsbaum attempted from the

first to manifest full emotional acceptance. In the first contract he implemented this feeling by granting to the union much more than it asked. "Union recognition was their objective, and I gave them more than they wanted. I gave them the check-off system, virtually a union shop and job security . . . an immediate raise of 5 cents an hour . . . and an open accounting procedure so that all our figures would be laid on the table, and we chose an impartial arbitrator to decide any issues we could not settle ourselves."

Grievance machinery was established; top management worked hard to cooperate with the union in solving mutual problems. It was difficult to convince some militant union people that management was now their friend; some supervisors and foremen had difficulty making the transition, feeling a loss in status with some power taken away from them. Some foremen who had too much difficulty working with stewards and shop chairmen either resigned or were discharged.

Mr. Buchsbaum has marshalled facts to substantiate his contention that it was "good business" to extend complete emotional acceptance of the union. "In place of one foreman to 20 workers in 1940, we now have one to 100 workers." "In the first half of 1946 our dollar volume of sales per worker was three times what it was in 1940. I attribute much of this increase to the group spirit in the plant." The union insisted on introducing Negro workers—"One of our plants with over 90 per cent colored people received an E Award from the Quartermaster for excellence in war production of a critical item. Fine workmanship, speed, outstanding diligence . . . earned the award." In the fall of 1949, union cooperation with management made possible a 25-cent decrease in the unit cost of a raincoat over a two-month period. Since the union assumed responsibility for individual discipline, discipline problems have almost disappeared.

These representations of management are supported by similar statements made in 1946 (1) by Mr. Laderman and Mr. Garfield of the union, confirmed to the authors in 1949. The present writers entered the scene in 1949 to conduct an evaluation of some of the probable attitudinal results of this dramatic reversal from emotional rejection to emotional acceptance of the collective bargaining organization. Tools employed included devices for measuring attitudes on diverse aspects of this total industrial situation.

**The Morale Survey.** Unlike previous morale surveys which generally emphasized study of attitudes of workers toward working conditions, pay, supervision, and other management-related attitude objects, this survey, at the valuable suggestion of Mr. Samuel Laderman, included also an appended union-related attitude objects section. The union section included the following questions:

"Item 12. How does this union compare with other unions that you know of?

"Item 13. How efficient is your union machinery as compared with that of others?

"Item 14. How does your shop steward compare with other shop stewards as to leadership ability?

"Item 15. Are you satisfied with the progress your union has made since the end of the war?"

The item measuring attitude toward shop stewards is constructed in a parallel manner to the usual item measuring attitude toward supervisor. Since the instrument used for measuring general job satisfaction, not mentioning the union, is The Tear Ballot For Industry, General Opinions, relatively comparable "norm" data from other surveys is available (2), enabling a resonable interpretation of whether the Buchsbaum results differ notably from normal expectancy in central tendency. The Tear Ballot embraces items measuring employee attitudes toward the following: job security, humanity of employer, supervisor, physical working conditions, co-workers, pay, free communication, management good intent, management good sense, and company influence on personal happiness. Distributed to all personnel in the three plants during July and August, 1949, a total of 467 completed anonymous ballots were returned.

**Results. *Morale Central Tendency.*** Median employee score was not significantly higher than normal expectancy as indicated by previous surveys of diverse types of companies and industries.<sup>2</sup> As in the typical survey, more than three-fourths of personnel were satisfied on almost all of the specifics of job satisfaction measured. It must be remembered that personal health and family and other non-industrial problems interfere in the job adjustment of a substantial proportion of any sizable sample of personnel at any time. In this limited experiment workers in an emotionally-accepted-by-management union are not notably higher in job satisfaction than are non-union workers in some previous surveys. It is possible of course that the imperfect comparability of previous surveys due to the time factor, racial-socio-economic make-up of personnel, etc., tend to underestimate the Buchsbaum results.

***Morale Structure.*** The significant and vitally important finding of this research comes in an unexpected but entirely plausible quarter. Apparently, mutual emotional acceptance and cooperation between management and union tends to structure employees' satisfaction attitudes along intergrated rather than divisive lines. Evidence for this is a positive Pearsonian coefficient of correlation between the total scores on the management ballot and the union ballot of .74. Corrected for attenuation, this value increases to unity, suggesting that the workers no longer carry "either-or" exclusive loyalty attitudes. As

<sup>2</sup> Median score of Buchsbaum non-office personnel was 36, which compares favorably with the median of 38 from previous surveys in view of the facts that a recession threat existed in the summer of 1949 (when the Buchsbaum survey was made) and that a majority of Buchsbaum personnel are inhabitants of the Negro "ghetto" area of Chicago's South Side.

the union and company learn to solve their mutual problems in an atmosphere of respect and cooperation, personnel tend to "take sides" less often. Their attitudes are less divided in favor of one side at the expense of the other, "fact-finding" orientation perhaps displacing "fault-finding" orientation. This apparent fusing of formerly conflicting loyalties appears also to occur, though perhaps less intensely, at the level of interpersonal relations between worker and supervisor or shop steward. The two parallel-constructed items below, one in each survey form, illustrates the latter point by a statistically significant positive correlation of .31.

"How does your immediate superior compare with other managers, foremen, or section leaders as to supervisory ability?

"How does your shop steward compare with other shop stewards as to leadership ability?"

In both cases the workers rated their supervisors and shop stewards on a five-point continuum: among the best, slightly above average, average, slightly below average, and among the worst. A significant tendency exists for workers to respond similarly rather than oppositely to supervisor and shop steward in the Buchsbaum enterprise. Employees who feel favorable toward one tend to feel favorable toward the other.

Reliabilities of instruments employed in this study have been investigated. Split-half coefficients stepped up via Spearman-Brown formula are .78 for The Tear Ballot and .63 for the union ballot. Some evidence on the validity of the former measure was reported in a recent study (3).

**Interpretation.** Either of two main hypotheses seems reasonable to account for the positive correlation between union orientation and management orientation of employees. (1) Divisive rivalry affiliation attitudes disappear under union-management cooperation. This hypothesis assumes that in union-management relations in which marked conflict and emotional rejection exists, personnel attitudes toward union and management will correlate negatively, implying existence of strong exclusive preference reactions of many workers toward union or management. (2) Any measurements of "respect for authority," even though different kinds of authority, will correlate positively if obtained within the same general culture. This hypothesis assumes that most workers who would react unfavorably to management would also react unfavorably to the union, simply because each one represents authority.

While admitting that the present evidence is not conclusive, the authors are of the opinion that the second hypothesis is much less tenable than the first. A more conclusive test of the first hypothesis can be made by repeating the same measurements taken in this study in a factory in which conflict and emotional rejection of the union by management are known to exist; if in this situation management orientation and union orientation of personnel are negatively correlated, then it will appear that integrated structuring of workers' attitudes may reasonably be expected as a result of union-management

mutual emotional acceptance and cooperation. Whether or not such integration is psychologically or economically desirable constitutes another set of problems.

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## Part Eleven: PSYCHOLOGISTS IN INDUSTRY

### 1. The Staff Psychologist in Industry

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*Ronald Taft*

Reprinted from the *American Psychologist*, 1946, 1, 55-61, by permission of the author and of the American Psychological Association, Inc. For the student trained in psychological techniques, but inexperienced in their practical industrial application, the author offers advice on how to deal with problems of job analysis, selection testing, training and research opportunities. It is emphasized that the staff psychologist of a firm should be prepared to concern himself with administrative as well as psychological work.

During the war, both in the fighting services and in industry, it has become more and more common for psychologists to be employed as active personnel workers, rather than as outside consultants called in to give advice on a specific problem—in most cases, to introduce an aptitude testing program. In the United States, it was already becoming common before the war for trained psychologists to be employed in personnel departments, and the experience of the past few years will probably increase this trend. Industrial morale and the adjustment of employees to their jobs are being more and more accepted as provinces closely linked with the techniques of the psychologist; and while most investigations into morale are carried on by outside consultants, the recommendations which result from these investigations are such that they can best be handled by persons trained in psychological techniques, e.g. recommendations with regard to the scientific selection and placement of employees or surveys into the attitude of the employees towards their work.

One reason for the growth in the use of trained psychologists as personnel workers is a tendency to move away from mass psychometrics to a more individual clinical approach, taking into account the individual as an organic whole whose behavior is the result of personality factors and environmental forces as well as abilities. The shortage of labor during the war and the demand for full employment should have ended forever the use of tests as a mass instrument for rejection or acceptance of applicants for employment. The tendency now seems to be to take test results into account, together with a large number of other important factors, such as social attitudes, interests, family history, training, etc., in order to assist in the correct placement, super-

vision, and training of employees during their entire course of employment with the firm. As a result, the demand is increasing for personnel workers properly trained not only in psychometrics but also in social psychology and the psychology of personality.

This article is being written primarily for the college graduate trained in these techniques but perhaps not so experienced in the practical requirements of personnel management. Articles dealing with the psychometric principles underlying the use of tests for the selection of employees for particular occupations are found in many psychological journals,<sup>1</sup> but the practical details of their introduction and use by a psychologist as a member of an industrial organization has been given little space.

**The Demand for the Psychologist.** Let us consider first some of the events that may have led to the appointment of a psychologist to the staff of any particular industrial enterprise. Frequently, the psychologist is first employed to introduce aptitude tests, and it is only from this beginning that he spreads out into other branches of personnel management. But he is not appointed without some prior promptings of the management of the firm, and we should consider some of the types of prompting that occur.

*Keeping Up with the Joneses.* Many managers seem first to get the idea of employing a psychologist as a result of a visit to some firm which uses psychological tests, or as a result of a conversation with the manager of such a firm. Usually, the latter will tend to exaggerate the ease with which tests may be introduced and will gloss over the difficulties involved in their validation, so that the impression is created that the appointment of a psychologist will quickly result in the elimination of practically all employee misfits. This is a point of view of which the prospective industrial psychologist should be wary before accepting his appointment. It is obvious that in the long run it is better for the psychological profession to admit its own limitations and perhaps even to exaggerate them than to try to hide them.

*The Enlightened Manager.* A more satisfactory reason that may lead a firm to appoint an industrial psychologist is for the manager or personnel manager to be convinced by his training or experience of the usefulness of the science. He may have been "sold" on the idea as a result of his reading on management problems,<sup>2</sup> or of his training in management, as a result of the information issued by professional bodies such as the American Management Association or the industrial relations division of a university, or as a result of the extension of some testing assignment which had been begun by a consulting agency. In these cases, the management usually has a fairly cor-

<sup>1</sup> For example, Shuman, J. T., The value of aptitude tests for factory workers in the aircraft engine and propeller industries. *J. appl. Psychol.*, 1943, 29, 156-160.

<sup>2</sup> For example by such an article as Moore, H., Experience with employment tests. *Nat. Indus. Conf. Bd. Personnel Policy*, 1941, No. 32.

rect perspective of the background necessary for testing, but occasionally an over-enterprising personnel officer or foreman decides to try to introduce the tests himself. As a result of the almost invariable failure of such an attempt, the manager is then either exceedingly sceptical when any references to tests are made (as happened so frequently in the United States in the '20s), or he places the work entirely in the hands of a trained psychologist. Therefore, it is suggested that the psychologist should check whether tests have ever been used in a firm before he accepts his appointment there.

*The Experimentalist.* Then there is the manager who has an open mind on the question of tests but remains unconvinced by anything he has not seen himself. He wants to try out the use of tests in practice, and he will probably send several employees or applicants for positions to a testing agency or to his prospective industrial psychologist for the "once over." In such a case, the psychologist would do well to look for temperamental or vocational interest anomalies in his subjects as they often will be found to have been chosen for their abnormalities. He would be wise also to see that these experimental cases are tested under the best possible circumstances—suitable accommodations and testing conditions, plenty of time to probe the personalities, and reasonable co-operation from the subjects. Also he should make sure that a success in the preliminary cases does not lead the management to expect too much from future cases.

**Functions of the Industrial Psychologist.** What are some of the industrial functions concerning which the psychologist may claim that his techniques are relevant?

*Job Analysis.* The psychologist should analyse jobs at first only in connection with the selection of trial test items rather than in terms of the requirements of the employment officer. However, when he knows more about the firm and the various types of jobs in it, he may undertake the latter project in conjunction with the employment officer. His special training and his experience in the use of objective measuring techniques make him particularly suited for drawing up the specification side of the job analyses, but he should be careful not to over-estimate what his training makes him capable of doing. He is trained to deal with human abilities, but when it comes to describing the conditions of work, methods of performing a job, the function of the job, and other items concerned with a description of the job itself, he should realize that there are probably other members of the staff who are more suited than he is to deal in detail with these items.

*Motion Studies.* In making up his job specifications the psychologist must inevitably undertake a certain amount of motion analysis in order to describe the job operations. While it is admitted that motion study may use to advantage the experimental techniques of the psychologist, it is a highly specialized field, and one that has different personality requirements from those of either psychometrics or clinical psychology. Therefore, the psychologist who may

be originally employed as a purveyor of tests would do well to moderate his claims about carrying out motion analyses apart from the job specifications which are a prerequisite to scientific selection.

*Salaries and Wages.* Again this is an aspect of employment in which the industrial psychologist is not an expert, but in which he can make some contribution to the officer responsible for fixing the standards of remuneration by drawing up a statement of the abilities required to perform the various jobs successfully. This information may even be called for in connection with the calculation of wages by collective bargaining procedures. But the psychologist should not expect to play a leading part in the actual fixing of the standards, as factors relating to historical events involving collective bargaining and industrial arbitration enter largely into wage determination.

*Selection of New Employees.* The tests may be applied in two ways to the selection process: (1) as a mechanical instrument to select a number of employees for a particular kind of job out of a large number of applicants; and (2) as a clinical instrument to examine each applicant in order to place him in the job that would most suit him, taking into account, of course, what is available. A distinction has already been drawn between these two methods of selection, both of which require different techniques. However, there is considerable overlap between the two, and the staff psychologist cannot afford to ignore either the statistical basis of psychometrics or the clinical basis of individual consideration. Their relative importance will vary from industry to industry, but the clinical techniques seem to have increased greatly in the last few years when great bodies of inexperienced workers have been hired, and it will probably apply equally as strongly in the post-war adjustment period because of the innumerable persons who will need special guidance and counseling. In any case, it is a moot point where "vocational guidance" and "vocational selection" begins.

*Transfers, Promotions, and Terminations.* These aspects of the selection process are special applications of the employment procedure and may utilize psychological tests in the same way as in selection. However, it should be remembered that they require specific organizational plans and arrangements in order to include the psychologist automatically in the procedures, for otherwise he may be overlooked.

*Training.* The psychologist can assist in two ways in a training program: (1) by aiding in the selection and guidance of employees for industrial training; and (2) by acting as adviser to the training officer with regard to the principles of teaching and the laws of learning. The first function employs the techniques of psychological testing and vocational guidance, but the latter function applies more to the educational psychologist than to the psychometrician. The same warning is repeated as was given in the case of motion studies—that the psychologist should make sure that he has the necessary knowledge before taking up this field.

**Problem Cases.** Where an employee is a particular problem with regard to discipline, concentration, social contacts, or output, the psychologist may apply clinical techniques and attempt therapy by any possible means that may be appropriate (1, 6). The tendency today in industry is to give an employee a chance to improve before dismissing him for any of the above-mentioned defects which may or may not be easily curable, as it is realized that temperamental difficulties may be due to causes that may be fairly easily eliminated by psychological treatment.

**Employee Rating.** The regular rating of employees is so closely inter-related with the above functions that it should be handled by the industrial psychologist, if it is at all possible. The knowledge of the questionnaire techniques as applied particularly in social psychology are useful in the construction of rating forms.

**Industrial Hygiene.** Such questions as fatigue, introduction of rest periods, changes in work, ventilation, lighting, diet, etc., are part of the work of the psychologist, but again are specialized subjects and may not all be capable of handling by any psychologist.

**Morale.** Although in the long run industrial morale depends almost entirely on the quality of the leadership in the organization, there are almost limitless possibilities for the psychologist in the application of clinical techniques to individual employees and the techniques of social psychology to the group as a whole. Thus he may accept the responsibility for a morale survey amongst the employees and pass on the information so obtained to the executive concerned. Or he may lead the executive training conferences on questions that relate the way in which psychology can be applied to the supervision of employees, and so indirectly assist in the improvement of morale throughout the firm (3).

**Research.** Finally, the techniques of the psychologist may be applied to personnel research problems such as the validity of various employment techniques and the development of further ones, or the factors that affect morale, labour turnover, absenteeism, health hazards, accidents, etc.

The work of the industrial psychologist can be broadly summed up by describing it as "the attainment of the maximum possible adjustment between a man and his job." But the actual extent of both operating and advisory responsibilities of any individual psychologist will vary both with the organization for which he is working and with his own specialized training. The above summary of the uses to which psychology can be put constitutes a maximum rather than an essential coverage.

**The Psychologist and the Personnel Department.** As has already been said, the psychologist should consider, before taking up an appointment, the reason why he has been appointed and the functions that he should be prepared to carry out. Some of these functions will already be handled in a more or less mature way by certain present members of the firm. For example, the

employment function may be the province of one or more of the employment officers, or even be the function of the foremen. In this case, consideration must be given to the effect upon these officers of the appointment of an "academic" man who will be depriving them of some of their authority. Often, the appointment of a psychologist results in hostility amongst officers who regard themselves as possessing "vested interests" as far as certain aspects of the personnel functions are concerned. Beware of internal politics.

This difficulty may be obviated in either of two ways: (1) the psychologist may take over entirely some aspects of the personnel function, such as employment; or (2) care can be taken to ensure that only officers convinced of the value of modern psychological techniques are in control of the personnel functions.

In either case, the appointment of the psychologist does not occur *in vacuo* and must affect the existing organization in some way. It may even involve a major alteration in policy. The psychologist should therefore consider the circumstances of his appointment carefully and plan his approach to others, bearing in mind the fact that he may not get willing co-operation from all sides. Where neither of the two cures suggested above for this difficulty are possible, he should commence duties as a research and advisory officer without authority to enforce any decisions or views on those officers actually responsible for the operations. He thus will in time convince those who control the various personnel functions that they can be aided by the use of the techniques of the psychologist. For instance, all new employees may be tested, but the employment officer may not be bound by the findings of the psychologist (although they may have a good deal of moral authority). But as research is conducted into the success of the employment methods, the results must eventually convince any man worth his salt that he can make use of the results. It is, of course, not considered advisable to replace the ordinary interviewing technique entirely by tests. The psychologist must indeed be a man of patience.

However, there are some members of the "old school" who have no time for new-fangled methods and who will never be convinced by them. In such cases, the psychologist would do well either to insist that the personnel department be reorganized or to resign. He is advised to consider carefully any appointment in a firm so backward in personnel control that there is no separate personnel department. In any case little success is likely to accrue to the use of psychological techniques where they are forced onto unwilling executives; they must obtain authority by conviction and demonstration and not by disciplinary measures.

One of the suggested cures for this difficulty would be to appoint personnel officers with a sound knowledge of industrial psychology to the various operating positions. Unfortunately, there are too few psychologists who are also

capable of assuming administrative posts in a personnel department, although university graduates in psychology do sometimes undertake such positions and then often prove in practice incapable of carrying them out.

**The Introduction of Psychological Techniques.** We have outlined a number of possible functions of industrial psychology and the difficulties of introducing them into the personnel department. Now we might ask "Where should the psychologist start applying psychological techniques?"

The most suitable place for the psychologist to start will vary from firm to firm, but one of the best is to interview all persons terminating. This may be done by arranging for the psychologist to consider each termination before final payment to the employee is approved. The exit interview may reveal facts in regard to the selection of staff and about the firm generally that will be valuable in validating psychological procedures. At the same time, the psychologist may be familiarizing himself with the organization and getting to know the executives. He also may begin to form an opinion as to which types of employees are most in need of the application of psychological methods.

Sometimes a new man may commence duties by working on an actual process in the factory or by going to the works training school. But, while this method may reveal useful information, if the psychologist is incognito, it may cause trouble later on, if the employees or the foreman or the instructors consider that they have been spied upon. In most cases, it is better for the psychologist to wait until he is known and then openly undertake such work in order to familiarize himself with the processes. Again, whether this is advisable or not depends on the organization and the standards of the employer-employee understanding in the firm.

At the same time as he is familiarizing himself with his firm, the psychologist may offer to help a few executives with some of their individual problem cases. Such individuals may be subjected to the standard clinical and vocational techniques, and the results discussed with the supervisor. Such cases help the psychologist to understand some of the problems likely to be encountered and to help the supervisors to form some idea of the assistance that may be given to them by the use of psychology in regard to disciplinary problems.

A warning should be made here to beware of having to stand or fall on these problem cases, because the psychologist is sure to be handed a number of "sour lemons," who for some reason or other are impossible to cure without a prolonged course of psychotherapy, for example the irritable and obsessive old maid in her forties whose manner is threatening to cause a series of mass resignations.

Another suggestion for one of the first steps that can be taken to bring about the acceptance of psychological techniques is executive and foreman-

ship training classes. It is of considerable help if there are regular meetings of the supervisors to discuss and hear various points on management, since the psychologist may be able to lead several of the discussions of the use of psychological methods in management, particularly the use of tests. In this way, he can help to "sell" the importance of his work to the executives, hear the kinds of difficulties that he must be prepared to overcome, and find out who are likely to be his easy and his difficult "customers" (5).

**The Validation of Tests.** As mentioned in the section headed "The Functions of the Industrial Psychologist," the systematic drawing-up of job descriptions and specifications should not be attempted in the early stages. The psychologist should be content at first with using job analyses only in connection with devising trial test items, but in this endeavor he will gather together information that should be very useful to the employment officer.

The statistical details of the validation of test items for various purposes have been dealt with adequately in many publications and will not be repeated here. However, the reader's attention is directed to an article by Driver (4), setting out three methods of introducing tests: (1) Standardization of tests to meet requirements of a particular situation; (2) "Clinical" method; and the (3) "Follow-up" method.

The actual procedure to be followed in validation will vary according to which one of these techniques is followed, although it is probable that they all will be used in various connections. In any case, before any tests are used for selection or prediction purposes, it is wise to try out the battery on a trial sample, whether of new employees or present employees, even though standard tests that have already been validated in similar industries are being used.

**Testing a Sample of Present Employees.** If seeking volunteer "guinea pigs" amongst the present employees, it is important to select a section of the firm where the supervisor is sympathetic towards the project. When the employees are asked to volunteer to be tested they should be told who will see their results, whether their results will be kept on record, and if so, how this may influence their future in the firm. In particular they must be informed that the results will not prejudice their employment in any way. Unless these precautions are observed, the least that can happen is that subjects will be difficult to obtain or results will be invalid, and the worst is that there will be a strike of employees. In dealing with factory personnel, it is wise to consider the possibility of conferring with union representatives before engaging in preliminary testing. Otherwise, it may be more politic to confine testing to applicants for employment or to new employees, and then to wait until the employees have been employed long enough to establish a criterion (i.e., Driver's "Follow-up" method).

**The Criterion.** Without going into a general discussion of how to establish a reliable criterion and its use in devising suitable test items, there are a few

points that might be made in this connection. In most cases there is no suitable objective measurement of an employee's value to the firm. Even such measures as productive quantity and marks on examination in the training school are not completely reliable. It often happens that tests based on these criteria will be criticized for not detecting the agitator, absentee, or eccentric who nevertheless has good abilities. Each employee contained in the sample should be studied as an individual as well as a collection of traits. It is therefore suggested that whatever criterion is used, there also should be some kind of rating scale to throw light on various aspects of the employee, and wherever possible the employees in the sample should be given an interview like the one to which new employees are subjected.

In the course of validating the test items, the psychologist will come across a number of employees who, for one reason or another, are not contributing to the firm all that they are capable of doing. These cases should be discussed with their supervisors and the circumstances surrounding their deficiency ascertained, as they might have an influence on the use of the tests. Regard should also be paid to the evaluation of the effect of the employee's interests and personality on his abilities. Thus the process of establishing criteria for the use of tests may constitute a basis for extending the psychological handling of industrial problem cases. It will usually be found that a few striking successes in such cases will do much to convince the executives of the usefulness of psychology in industry.

The validation of tests also provides a good starting point for the introduction of a complete employee rating scheme. Such schemes often start out as a single rating of whether an employee can be classed as "good," "fair," or "poor," but they are gradually analyzed into details until a number of traits are covered by the ratings. These may then serve as a basis for indicating the strong and weak points of employees throughout the firm with a view to providing special treatment when required and for use in connection with promotions, transfers, and terminations.

**The Introduction of Tests into the Employment Procedures.** As indicated before, the actual introduction of the tests requires that the employment be controlled by a central office, so that arrangements can be made to test applicants when required. Again it is suggested that the information regarding test results should be drawn to the attention of the officer who hires the employee, in the way of advice rather than in a mandatory fashion. After a while it is found that some of the supervisors learn to value the test findings and even to ask for them, until eventually the psychologist feels that his position is strong enough so that he can assert himself more. However, the psychologist should never have the right to force a new employee onto a supervisor against the latter's will.

The same point applies in the case of promotions and transfers which are,

in a way, new appointments. At first the psychologist can ask to interview all persons being promoted or transferred until he becomes an accepted part of the organizational system involved in staff changes. Of course, there will always be a number of executives who will back their judgment against that of the personnel department, and they will find many tricks by means of which they may circumvent the system, but these cases have to be tolerated. The only hope in these cases is to see that their successors are persons who are better trained in the use of specialists in management than they are (2).

**The Later Development of the Work of the Psychologist.** So far, most of the discussion has been centered on the introduction of tests. The reason for that is that testing is the only aspect of personnel management at present that is widely recognized as being a function of a skilled professional, and therefore, it is the function in connection with which the staff psychologist wields the greatest authority. But the other psychological functions branch out from this source and when the preliminary work mentioned above is completed, the psychologist must be prepared to expand. Let us briefly deal with the other functions that may be exercised by the industrial psychologist. The main items are job analyses of a more thorough nature, job evaluations, industrial hygiene, and morale. The extent to which the psychologist can exercise an influence in these matters will depend largely upon the attitude of the personnel officer or the general manager. The psychologist may have to emphasize the importance of these functions in special reports to the management until he has convinced the officer concerned of their importance. However, these are items that concern one or two senior executives only, and are therefore in a category different from the ones that have been dealt with before, which concern the psychologist's relationships with a large number of supervisors.

However, these later developments are functions that the psychologist can afford to disregard until he has passed through the foundation stage of establishing the basic testing, employee rating, and standard organizational procedures to be used, and of obtaining their acceptance.

The actual process of designing tests and rating scales is a service that may be provided by a consultant, but the process of seeing that these techniques are used, and used correctly, must be the function of a properly trained member of the staff. Nor does the fact that these techniques have been accepted mean that the psychologist's task is completed. Apart from actually maintaining the system, it is necessary from time to time for him to be prepared to amend or renew the tests and rating forms to fit in with changes in the industry and to prevent their becoming invalid through too much familiarity.

At the same time, the psychologist can fully occupy himself with employee counseling, morale surveys, and personnel research. As he becomes more and

more acquainted with his firm, he will take up increased administrative duties, until he is in line for an executive position. In fact, this administrative function is one of the main differences between the consulting psychologist and the staff psychologist, and the latter should be prepared to adapt himself to administrative duties before he takes up psychological work as an actual employee of a firm.

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## 2. Psychologists in Industry

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Reprinted from *Personnel Psychology*, 1948, 1, 145-161, by permission of the author and of Personnel Psychology, Inc. This article is based upon questionnaire data from psychologists employed in industry. From these data can be identified the trends, the professional status, and the educational and training requirements for those planning to enter industrial work.

**Introduction.** It has been apparent in recent years that "industrial psychologists" are gaining in number and that their duties and functions are increasing in scope. In fact, the field of "industrial psychology," or "applied psychology in business and industry," is now so large that it cannot be described simply without serious omission. Because of this expansion, there has been considerable speculation as to what psychologists are now doing in their jobs in business and industry.

The recent war has given great impetus to the expansion of psychologists' functions. The problem of this paper is to describe and give some of the results obtained from a detailed questionnaire study of psychologists employed in industry. Shartle (1) gave considerable insight into this problem in his descriptions of "Occupations in Psychology." However, the data from which the descriptions were developed were collected prior to the conclusion of World War II and could not reflect the post-war changes and trends.

Further, there was no attempt in this study to develop job descriptions such as Shartle has done. The purpose of this study was to obtain data concerning the present job functions and duties of psychologists in industry in order to identify the trends, the professional status, and the desired educational and training requirements for psychologists planning to enter industrial work.

The questionnaire survey was made during the summer of 1947. Each psychologist selected was sent a five-page microtyped questionnaire blank and a covering letter.

The questionnaire was a job-analysis type with check-list items presented under the major divisions and space to write in any additional techniques used, or duties and functions performed. The items were obtained from the extensive literature, job descriptions, and detailed personal interviews of approximately twelve industrially employed psychologists. The questionnaire was submitted to several "trial-runs" and revised accordingly each time. The final edition was as comprehensive as possible without the overlapping of items in the divisions. The divisions of the questionnaire were for purposes of data tally and organization.

The criteria for selecting the psychologists were (1) holding a full time position in business or industry, and (2) holding membership in the American Psychological Association. Because of the nature of the APA 1946-47 *Yearbook*, which was exclusively an address book, it became a very difficult task to determine who at present fitted the criteria. However, approximately two hundred and twenty psychologists were located who appeared to fit the criteria.

The major divisions of the questionnaire will be presented in the discussion of the results.

**Results of the Study.** Completed usable questionnaires were received from one hundred and three respondents without follow-up of any kind. A number of psychologists replied that they were not in business and industry or that they had taken jobs no longer so classifiable. Consequently, in the final analysis, it appeared that approximately one hundred and ninety psychologists then employed in business and industry comprised the total sample to whom questionnaires were sent. In this case, then, the returns totaled fifty-four per cent, which appeared to indicate strong interest on the part of the psychologists concerned.

The respondents were classified into three broad areas of employment, *viz.*, Business and Industry Group (56 respondents), Consulting Group (37 respondents), and Advertising Group (10 respondents).

It should be noted that the questionnaire design was not as adequate as desirable for the Consulting Group psychologists. Several reported that they

could not indicate several of their functions in the items presented. One function of this type was that of contacting top executives and explaining (or "selling") their services which took a large amount of their time and required several specialized techniques. Also, a few reported that they were capable of utilizing several techniques or performing several duties not specified in the questionnaire, and while so far they had not been required to, they expected to use them in the future. The results, then, must be interpreted for the Consulting Group as being partially representative with the possibility of their expanding the functions performed and the techniques used.

The data obtained from the respondents are summarized under the topical questions used in the questionnaire. Under limitations of space a considerable amount of interesting data must be treated briefly. (Further specific information concerning any topic included in the study may be obtained by writing the author.)

## **Questionnaire**

### *1. What Is the Title of Your Position?*

One fourth of the respondents had "psychologist" as part of their job titles. In the Business and Industry Group, 65% had titles denoting technical, personnel, and top executive functions. The remainder had functions "technically psychological" in nature according to the job title, such as Testing Administrator, Personnel Research Assistant, Staff Consulting Psychologist, etc. In the Consulting Group, 69% had positions which were "technically psychological" in nature. The remaining 31% had duties largely administrative in nature as far as the titles were concerned. The Advertising Group was quite similar to the Consulting Group in terms of titles.

### *2. What Is the Type of Industry?*

The respondents in the Business and Industry Group represented thirty-one separate industries. No particular industry employed a large number of the psychologists, and all the employers appeared to be large corporations. The Consulting Group members worked in both large and small companies, and mainly specified work as general psychological consultants. A few worked for specific industries. In the Advertising Group, two of the ten were employed by general business research firms, and the remainder by advertising agencies.

### *3. (a) How Many Hours Do You Work on This Job in an Average Week?*

The range extended from 35 to 70 hours per week with the top executives specifying the longer hours. The median and the mean hours were approximately the same for the three groups. Median—40 hours, mean—43 hours.

3. (b) *For How Many Work Days Do Your Job Duties Take You Away from Your Home Office in the Average Month?*

As expected, the Consulting Group respondents reported more days away than the other two groups, viz., mean of 8.4 days, median of 8 days. The Business and Industry Group had 4 days for both mean and median, while the Advertising Group had 3 days for both.

4. *What Is the Title of Your Immediate Supervisor?*

Two-thirds of the respondents reported to top executives as denoted by titles. Six per cent occupied top executive positions themselves. The remainder reported to staff or technical executives. In the group breakdowns, the Business and Industry members divided evenly, half reported to top executives and half reported to technical executives. The Consulting and the Advertising Groups' members reported primarily to top executives.

5. *What Is the Next Job in Line of Promotion for You?*

Considering all the respondents, one-half of them indicated that they had none, or at least no definite line of advancement. In the Business and Industry Group, 35% had no jobs to which they could advance—or at least—no definite job. In the Consulting Group, 66% had no job "up the ladder." One respondent expressed it as "Lord only knows!" The same was true for one-half of the Advertising Group members.

6. (a) *What Beginning Salary Could a Ph.D. in Psychology Just Out of School Expect to Receive in Taking a Job in Your Company?\* (Annual.)*

	Range	Median	Mean
Business and Industry.....	\$3,000 to \$6,000	\$3,600	\$3,850
Consulting.....	\$2,400 to \$6,000	\$4,500	\$4,556
Advertising.....	\$3,000 to \$4,800	\$3,500	\$3,710

*Salary a Person with the M.A. in Psychology Could Expect? (Annual.)*

	Range	Median	Mean
Business and Industry.....	\$2,400 to \$5,000	\$3,000	\$3,220
Consulting.....	\$2,000 to \$5,000	\$3,200	\$3,280
Advertising.....	\$2,400 to \$3,600	\$2,500	\$2,800

\* *Editor's Note:* The reader is reminded that these figures are based upon 1947 wage scales.

6. (b) *What Is the Average Upper Limit in Salary for Him Without a Change to a "Non-psychological Job"?*

	Range	Median	Mean
Business and Industry.....	\$3,600 to \$15,000	\$6,500	\$7,325
Consulting.....	\$4,000 to \$20,000	\$7,600	\$8,965
Advertising.....	\$8,000 to \$25,000	\$10,000	\$13,250

The salary questions were not answered by approximately one-quarter of the respondents. However, there was enough consistency in the data to propose that these salaries appear to be comparable to academic salaries (Wolfle, 2), (Bryan and Boring, 3), if the psychologist desires to continue in a career of psychology. A number of the respondents indicated that salaries could increase appreciably if the psychologist would move into line executive positions.

7. *Work Analysis of Major Functions.*

The importance of the various work areas of respondents as they indicated on the questionnaire was determined. Obviously, the individual jobs required different combinations of the techniques and functions to be described specifically. However, the major functions and duties of the sample as a whole and the three sub-groups were of major interest for present purposes.

The results are presented in Tables I and II. Table I shows the results obtained from the entire group, and Table II shows the results obtained from the three sub-groups (A) Business and Industry Group, (B) Consulting Group, (C) Advertising Group. In order to show the relative importance of the various work areas, the total frequency of response to the items appearing under each major work area was summed for each individual. This result was then converted into a percentage of his total possible response to the items under each major work area. In this way a range of percentages was established for each work area. A mean percentage for each division for all 103 respondents was computed (from the frequencies and not by averaging percentages). The range and the mean for each major work area are presented at the left of the work areas which are ranked in decreasing mean order in the tables.<sup>1</sup>

<sup>1</sup> The range and the means in these work areas may be interpreted roughly by the reader as follows: The range was established by locating the item in each work area reported by the smallest percentage and the item reported by the largest percentage of the respondents. The mean percentage of response for all the items in each work area was calculated. Since the total *N* is close to 100, it is possible to interpret e.g., (1) "Administration of Research" as 57 was the smallest number of psychologists performing in this area and 73 was the largest number. The mean number was 63.

TABLE I. THE RANGE AND MEAN OF PERCENTAGES OF RESPONDENTS HAVING WORK FUNCTIONS IN EACH WORK AREA  
( $N = 103$ )

Range	Mean	
1. 57-73	63	<i>Administration of Research</i> (Determination of specific problems for research; initiation of and staffing for research projects; arranging for research; etc.)
2. 11-85	60	<i>Statistical Methods</i> (Construct graphic charts; use measures of central tendency; use measures of significance; design statistical plans for research projects; etc.)
3. 37-58	48	<i>Test Interpretation</i> (Interpretation of tests to determine hiring requirements; interpretation of test results for interviewers and counselors; explanation of test results to individuals; etc.)
4. 32-57	45	<i>Test Administration</i> (Experimental testing—locally constructed tests; individual employment tests; experimental testing—published tests; etc.)
5. 20-69	43	<i>Occupational Analysis Methods</i> (Job description; job analysis; job specification; job evaluation; etc.)
6. 15-65	41	<i>Interviewing</i> (Advisor to interviewers; do employment interviewing; administrative interviewing; etc.)
7. 11-72	40	<i>Rating Scales</i> (Devise rating scales; analyze rating scales; study results from rating scales; use for getting criteria in test validity studies; etc.)
8. 24-48	36	<i>Questionnaire Survey</i> (Job analysis questionnaire; attitude toward a specific thing; morale surveys; etc.)
9. 11-52	33	<i>Clinical and Personal Analyses</i> (Personal consultation; vocational guidance; personality adjustment; transfer recommendations; etc.)
10. 8-66	31	<i>Administrative Duties</i> (Making reports of various kinds; advising on company policies; handling certain correspondence; preparing progress reports; making speeches; etc.)
11. 14-36	24	<i>Test Construction</i> (General ability tests; attitude and morale tests; clerical tests; personality tests; achievement tests; etc.)
12. 0-57	22	<i>Education and Training</i> (Consult on training methods; prepare source materials; organize training programs: supervisory, induction, interviewer; etc.)
13. 3-50	20	<i>Specific Research</i> (Testing program; interviewing procedures; employment procedures; merit rating; qualifications for jobs, etc.)
14. 9-45	19	<i>Labor Relations</i> (Recommend personnel policies; develop personnel policies; prepare information for release; attend bargaining conferences; etc.)

The percentage statistics in all the tables were calculated in the same way. The items appearing beneath the work areas in Table I were taken from the questionnaire.

TABLE II. THE RANGE AND MEAN OF PERCENTAGES OF RESPONDENTS HAVING WORK FUNCTIONS IN EACH WORK AREA (BY GROUPS)

Range	Mean	
<b>A. Business and Industry group (N = 56)</b>		
1. 48- 81	66	Administration of research
2. 15- 80	59	Statistical methods
3. 35- 65	49	Test interpretation
4. 30- 57	43	Test administration
5. 14- 61	39	Occupational analysis methods
6. 6- 63	39	Interviewing
7. 3- 68	38	Rating scales
8. 4- 70	37	Administrative duties
9. 15- 60	36	Questionnaire surveys
10. 9- 52	32	Clinical and personal analyses
11. 9- 50	25	Labor relations
12. 9- 36	24	Test construction
13. 0- 59	23	Education and training
14. 2- 59	22	Specific research
<b>B. Consulting group</b>		
1. 50- 66	59	Test interpretation
2. 9- 88	58	Statistical methods
3. 25- 78	56	Occupational analysis methods
4. 38- 67	55	Administration of research
5. 34- 75	54	Test administration
6. 19- 84	51	Rating scales
7. 12- 69	41	Interviewing
8. 15- 63	41	Clinical and personal analysis
9. 25- 53	37	Questionnaire surveys
10. 15- 53	30	Test construction
11. 0- 66	23	Education and training
12. 0- 66	23	Administrative duties
13. 0- 63	18	Specific research
14. 3- 47	16	Labor relations
<b>C. Advertising group (N = 10)</b>		
1. 60- 80	67	Administration of research
2. 0-100	58	Statistical methods
3. 0- 90	40	Interviewing
4. 20- 80	37	Questionnaire surveys
5. 0- 60	23	Administrative duties
6. 0- 40	15	Occupational analysis methods
7. 0- 50	15	Rating scales
8. 0- 20	10	Test interpretation
9. 0- 70	8	Specific research
10. 0- 10	8	Clinical and personal analyses
11. 0- 10	7	Test administration
12. 0- 20	5	Education and training
13. 0- 30	3	Test construction
14. 0- 20	2	Labor relations

(The items under each major work area are omitted in this table.)

*8. What Are Your Most Important Duties?*

With a few exceptions, the respondents were quite specific in answering this question indicating that their jobs were fairly specifically defined. The respondents were classified into empirical groupings based upon similarity of their reported duties. The three sub-groups have been so sub-divided, and the results are presented in Table III.

TABLE III. ANALYSIS OF MOST IMPORTANT WORK FUNCTIONS (BY GROUPS)

A. Business and Industry group ( <i>N</i> = 56)	
Duties involving:	
Personnel functions . . . . .	33%
Scientific, research and development functions . . . . .	25%
Policy and management functions . . . . .	20%
Labor relations functions . . . . .	12%
Education and training functions . . . . .	5%
No response . . . . .	5%
	100%
B. Consulting group ( <i>N</i> = 37)	
Duties involving:	
Personnel functions . . . . .	25%
Policy and management functions . . . . .	24%
General consulting functions . . . . .	21%
Research and development functions . . . . .	11%
Clinical functions . . . . .	10%
Labor relations functions . . . . .	3%
Market research functions . . . . .	3%
No response . . . . .	3%
	100%
C. Advertising group ( <i>N</i> = 10)	
Duties involving:	
Market research functions . . . . .	70%
Policy and management functions . . . . .	30%
	100%

### 9. What Are the Educational Requirements for Your Job?

	Business and Industry		Consulting		Advertising	
	Min- imum	Desir- able	Min- imum	Desir- able	Min- imum	Desir- able
A.B. ....	43%	4%	9%	6%	30%	12%
M.A. ....	24	24	31	6	10	..
Ph.D. ....	33	45	60	47	60	75
Don't know....	..	27	..	47	..	13
	100%	100%	100%	100%	100%	100%

As far as the course work, both necessary and desirable for their jobs, a large majority believed the following courses and areas are important in the training of psychologists for industrial work (in rank order of frequency of mention) : Statistics, Tests and Measurements, General Psychology, Clinical Psychology, Business Administration and Management, Experimental Psychology, Personnel, Economics, Educational Psychology, courses in other Social Sciences, and courses in Industrial Engineering. However, over 50 specific courses were mentioned as essential or desirable.

### 10. What Kind of Training Is There for Your Job?

The respondents emphasized "self-orientation" and "on-the-job" training for their jobs. Only 6 per cent reported formal training for their jobs. In regard to the "Average time to become proficient," the range was 3 months to 20 years with a median of 5 years. Some responses were "God knows," or "I have only been working on this job for fifteen years so I wouldn't know," or "Still learning after 12 years." This was probably due to the fact that the sample included some administrative positions requiring considerable time for proficiency.

### 11. What Are the Personal Requirements for Your Job?

The psychologists were presented with 52 items, all of which could be considered as "favorable" items as far as personal traits were concerned. Consequently, those selected by the respondents indicated the "best" traits from the "favorable." The following items were selected by 70% or more of the respondents.

1. Express self well in writing
2. Express self well orally
3. Initiative
4. Ability to make decisions

5. Adaptability	10. Sell program or service to others
6. Able to supervise others	11. Alert
7. Ability to accept responsibility	12. Tolerant
8. Tactful	13. Make good first impression
9. Cooperative	14. Fair-minded

Some of the respondents specified other traits they considered important and 29 others were added to the list. These included: "Ability to organize ideas for common understanding," "Imagination," "Capacity to improvise," and others, including one unexpected one: "Know languages, especially German and French."

### *12. What General Comments Do You Have to Make?*

The respondents were offered a series of questions which were professionally orientated. The following summaries express the majority opinion of the respondents and are not complete in detail.

#### *1. As a Psychologist, What Is Disagreeable about an Industrial Job?*

One-fifth reported "nothing." Other typical responses are "Attitude of Management," "Making research pay," "Selling," "Lack of control over experiments," "Executive dominance," "Necessary to satisfy person rather than make valid solution," "Unrecognized profession," "Indifference of education toward industry and industry toward education," "Lack of appreciation on part of industry of scientific approach to human affairs," "Short vacations," "Constant pressure," "Overcoming misinformation about psychological methods," "Limited too much by executives and colleagues who have been attending lectures (A.M.A., etc.) for many years and who therefore think they have all the answers to Industrial Psychology."

#### *2. Is Travel an Important Factor in Most Psychologists' Jobs in Industry?*

Travel was considered important in the work of Consultants, but in general, the total group did not believe it to be an important factor.

#### *3. What Is Your Opinion of the Present Ph.D. Requirements Now Existing in Most Universities?*

Two-thirds regarded them unfavorably. Typical comments were "Stinks," "Too unrelated," "Pathetically inadequate," "Terrible," "Too rigid for business world," "Too academic," "Inadequate background," "No opportunity to apply training on a practical basis," "Field experience needed," "Lack of realism," "Out-moded, out-dated." Some of those favorable had exceptions as "O.K. except for languages," "O.K. for specialized work," "Need additional training in economics and sociology plus practicum for administrative work."

**4. Is the M.A. in Psychology Sufficient Now to Get into Industry and Hold Down a Responsible Job?**

About two-thirds reported "yes," but some comments were characterized by "yes, but not for long."

**5. What Recommendations Do You Have for Psychologists Preparing for Industrial Jobs?**

One-third of the respondents advised experience, one-third specific educational course work, and the remaining third personal qualifying factors. Typical of the first was: "Get practical, get out of ivy-covered palaces, publish practical studies, and get experience," "Forget Ph.D. and learn job," "Training may be valuable 5 years or so later," "Get more clinical and industrial experience;" of the second: "Don't limit to psychology," "Get Business Administration," "Get Economics, Sociology, etc.;" Of the third: "Read everything in the field except textbooks," "Learn research techniques and be prepared to defend and sell them."

**6. Is Design of Equipment and Apparatus an Important Prerequisite?**

Four-fifths of the respondents report "No," and most of the remaining one-fifth think only in specialized jobs.

**7. What Do You Think of Consulting Firms As the Best Solution to Industrial "Psychological Problems?"**

In the Business and Industry Group, one-half of the respondents were unfavorable toward them. Some responses were: "No!!" "Poor," "Inadequate," "Not much, they don't have to live with their solutions," "Too much opportunism," "Consulting firms have too many kids," "Too many and too weak," "They are just snoopers trying to get experience." From the favorable: "It's a good one," "Probably are the answer if psychologists can stand working for them," "Have their place," "Good, if carefully selected."

The Consulting Group respondents were quite favorable. But a few believed that some consultants were "quacks" and were "bleeding clients."

The Advertising Group members were all favorable to the use of consulting firms.

**8. Should Credit Be Given Toward a Ph.D. Degree for Work in an Industrial Situation?**

Three-fifths of the respondents favored credits, indicating favorableness with such comments as "Mandatory," "Required—credit or no," "Some." The negative was voiced by "Never. What next?" "Unimportant," "No."

*9. How About the Usefulness of Foreign Languages?*

About 90% of the respondents were definitely against foreign languages as a Ph.D. requirement. Typical comments were "No!!!," "No!!!," "Nonsense," "Stupid," "Academic hangover," "Useless," ". . . waste valuable time needed for other things. . . ." Those who were favorable indicated primarily conversation for foreign language groups such as Mexican and Porto Ricans. A few indicated usefulness in specialized areas, e.g., Sensation and Perception Research.

*10. Is There Much Satisfaction in an Industrial Job?*

About 90% of the respondents were favorable to industrial work. This was characterized by: "Tremendous," "Enormous," "Absolutely," "I love it." Some had qualifications: "Not too much," "Yes, but not like teaching if pay was better."

*11. What Extent Do Your Services Make a Difference in Company Policies?*

The respondents believed that their services had a definite positive influence upon policy. Some comments were: "Considerable," "Enormous weight," "Almost all recommendations accepted," "Shape company policies," "Major," "Beginning to," "Direct effect in long term way." Only 3% were negative, reporting: "Practically none," and "Only to minor degree."

*12. Do You Give Advice More or Less Than You Prefer?*

A majority answering this question indicated "about right." Some reported "Too . . . often," "Transfers to things I know little about," "Full time job," "No limit."

*13. Do You Find Top Executives Becoming More "Psychologically Minded?"*

About 80% of the respondents answered in the affirmative. The Consulting members were unanimous (91% answering). Some affirmative comments were: "Yes, slowly," "Yes (naively)," "In conversation much, in practice some," "Yes, each in his own foggy, uncritical way." Negative comments were: "No!!," "No, too busy," "No, more interested in 'what' than how."

*14. What Predictions Do You Have of the Opportunities for Industrial Psychologists?*

The respondents were very definite in predicting a favorable future. However, nearly all had words of caution and advice. Some comments were: "Good, if properly trained," "Unlimited," "Vast," "Good, if not exploited by incompetents," "Tremendous need for 'practical ones,'" "Good, but not under that title," "Many areas barely scratched," "Industrial psychology can

become the outstanding professional field for psychologists." Others cautioned: "Extremely competitive—many will enter—few will survive," "Not much—the academic work must be geared to the requirements of specialized knowledge and techniques called for by industry. The present lag is so overwhelming that a monumental task lies ahead."

**Some Conclusions.** In the writer's opinion this study offers evidence which tends to contradict many of the commonly expressed ideas about what psychologists are doing in industry.

1. There was extreme variability in the functions and duties performed by the various psychologists. It appears, then, that there is no real profession of "Industrial Psychology" *at the present time*. The data in this study showed the utilization of many methods and techniques. However, there seemed to be no systematic, specific, organized relationship existing between all the psychologists and the companies, firms, and organizations which employed them. The titles of the jobs varied considerably, yet they could consider themselves psychologists. Their backgrounds and training apparently are quite similar, but this similarity did not necessarily carry over into their duties in the job. The only real basis for comparing them is still in terms of their academic training, not their present employed status. When "Psychologist" means the same thing to all employers and employees, then a profession of "Industrial Psychology" may be said to exist. *However*, it should be noted that the psychologists themselves, individually, are using professional psychological methods and techniques. Apparently they do have some professional status, but individually, not collectively.

2. The psychologists in this sample did not seem to be concerned with Test Construction, Education and Training, Specific Research, and Labor Relations to a large extent. These are areas in which psychologists are supposed to be hard at work, according to many people. Some of the respondents were, but this was not true apparently for the whole group. This is probably best seen in Test Construction where a few men were doing a lot. These appeared to be specialists, but they were many other things also.

3. Without entering into a discussion of what *should be* the functions of the psychologists, several things should be noted concerning the education and training of psychologists entering industry in light of the present duties, functions, etc., revealed in this study.

a. In general, psychologists in industry appeared to be critical of the existing doctoral requirements now in universities, especially in regard to the foreign language requirements. Few believed the requirements are satisfactory. The criticisms also included the lack of practical experience, but they were not very explicit as to what to do about it.

b. In order to rectify the inadequate training, the suggestions would seem, in the main, that psychologists should obtain a broad training seems espe-

cially desirable along with breadth of academic and applied training within the confines of psychology.

c. As far as psychological training is concerned the psychologists should have or obtain training which would enable them primarily to do work with (or in) Administration of Research, Statistical Methods, Test Interpretation and Administration, Occupational Analysis Methods, Rating Scales, Interviewing, and general administrative duties. These appeared to be of primary importance in the respondents' jobs. This does not mean that the other areas are not important; they probably are less so. Above all, general knowledge of industry is very important to good achievement in an industrial job. Certainly the truth of this is apparent in considering the broad major work areas of the respondents who reported the use of so many different tools and techniques in many different industrial situations.

As far as university training is concerned, certain suggestions might be offered. (1) Have the student perform a series of small research studies requiring the application of many varied and different techniques. This will give the student an opportunity to get "Experience" comparable to that required by industry. (2) Have the major research problems approached by "pooled research." By "pooled research" the writer means a psychological research project in which the student works in collaboration with professors and other students, each of whom contributes by means of a specialized approach or area of investigation. By this method the individual can enter into the large over-all planning and get the benefit of many points of view, both as to methodology and the relative significance of the various aspects of the project. (3) Have courses and/or seminars approaching the area here called "Administration of Research." This would aid greatly in giving information as to planning, costs, controls and variables, criteria, coordination, etc. This information is practically unobtainable at present.

d. Also, although not directly concerned with training, certain personal requirements are deemed essential. "Ability to express self well orally and in writing," "Ability to sell," "Adaptability," "Initiative," and many other traits appeared important in the psychologists' jobs. Some of the respondents were greatly concerned with the fact that some psychologists in industrial work were unable to cooperate successfully with other employees, causing considerable friction.

e. Finally, the future of psychology applied to industry appears to be very bright. However, the respondents believed that the best results will come when the universities are able to train the psychologists more in line with the actual jobs as they exist in industrial areas. They further indicated that a considerable shortage of competent personnel exists and probably will continue for some time.

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### 3. Ethical Problems of the Industrial Psychologist

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*Harold Seashore*

Reprinted from *Personnel Psychology*, 1949, 2, 103-113, by permission of the author and of Personnel Psychology, Inc. A summary of a symposium presented by the Division of Industrial and Business Psychology at the 1948 meetings of the American Psychological Association dealing with the problems of the ethical practice of psychology by consulting psychologists, staff psychologists, well-meaning but professionally naïve individuals and by exploiters and charlatans.

**The Nature of Consulting Organizations.** The control of professional workmanship and conduct in consulting firms doing psychological work was posed. Tacit was the assumption that the individual psychologist must face the ethical considerations inherent in his joining the staff of a consulting firm or forming such a firm himself. One can classify consulting firms which claim to do psychological work as follows:

1. Firms owned, staffed and operated by psychologists.
2. Firms owned and operated by other professional persons (e.g., by engineers) who employ psychologists on their staff. In some, the psychologists may be part owners as well.
3. Firms owned and operated by successful men in "practical business" (e.g., in advertising, selling or management) who employ psychologists on their staffs. Again the psychologists may be firm members.
4. Firms owned by sincere and well-meaning, but relatively naïve individuals, who may best be thought of as frauds as distinguished from charlatans. Psychologists have been known to join such staffs.
5. Outright exploiters and charlatans.

In all but the last level in this hierarchy, psychologists can practice their profession ethically or unethically and with good workmanship or poor performance. Conceivably a professionally sound psychologist could transmute a marginal organization into a qualified one. The probability of professionally ethical conduct, however, is greater as one locates in the upper two categories.

We should recognize, too, that good professional practice can be conducted by persons not formally trained in psychology; opportunity for their recognition is desirable and necessary.

The view was expressed that ethical standards should pertain to the *acts* of persons working in this professional field and not to their personal *qualifications* nor the *type of organization* by which they are employed. We should work toward the definition of proper and improper activities and then exert pressure to reduce the unethical practices both among our own members and by outsiders.

The panel assumed that the Division of Industrial and Business Psychology must take the leadership in defining standards of competence and the professional ground rules. Consideration should be given to the possibility of a listing or association of consultants meeting well-defined standards of professional qualification, both as to workmanship and as to ethical standards.

**Promoting One's Own Service.** Topics such as these were considered: Is promotional literature legitimate? If so, what kinds? Shall we actively "sell," such as calling on potential clients? Is advertising beyond the "professional card" ethical? Can publication of articles in journals and trade magazines degenerate into "planting" for advertising value? How about using one's membership in the American Psychological Association as a "qualification"?

No definite answers were secured. Lack of good taste has been demonstrated by some psychologists. Professional workers in all fields seem to agree that modesty is a virtue and flagrant house-top shouting a matter of bad taste. The idea was expressed that while in medicine the modest "card" is all that is considered legitimate advertising, the consulting psychologist is serving firms and organizations rather than individuals and hence can properly use some of the approaches of the market place.

The discussion found a real ethical problem to lie in the *content* of promotional materials. Does the approach serve the public interest? Does the consultant promise more than he or other qualified workers can deliver? Does one claim he or other qualified workers can deliver? Does one claim secret methods in order to gain acceptance? The question was briefly considered whether oral sales presentations may constitute a more serious problem for professional standards than printed advertising. Reports might be obtained from clients regarding the methods and claims of psychologists who approached them.

Before a consultant approaches a potential client he should ascertain whether another psychologist is involved, either as a staff member or as a competing consultant, and should let the psychologist know of the contact in order to prevent misunderstanding or embarrassment.

Perhaps most of the promotional problems would be solved: (1) when organizations like the Division of Industrial and Business Psychology have spelled out some standards of qualified psychologists in industrial work; (2)

when the American Board of Examiners in Professional Psychology diplomas are more widely held and understood; and (3) when good workmanship by all our colleagues induces business executives actively to seek out the qualified—but less noisy—individuals and organizations which might serve their needs.

**Scientific Integrity and Soundness of Methodology.** Industrial consultants offer two general classes of services. (1) They may act purely as directors of applied research. They offer the client not answers to his questions but only methods for obtaining valid answers by means of special research studies, usually on the job. (2) Sometimes, however, the client cannot afford such studies, or the nature of his working force is such that adequate samples cannot be obtained. In such cases the consultants may act as psycho-engineers. They offer the best advice they can in the absence of any locally definitive studies.

The basic professional problem of an ethical nature in the foregoing paragraph is the extent to which the industrial psychologist must have clearcut research findings—*in situ*—before recommending changed practices to his client. How much science? How much art? To what extent can a well-trained psychologist legitimately advise a client regarding incentive wage plans from his knowledge of the psychology of motivation and learning? The offering of such advice was thought quite ethical provided the consultants make clear to the clients the rather limited and necessarily unknown validity of the proposals.

When a consultant undertakes special researches for a client under adverse conditions, such as inadequate time, small samples, and the like, he should report the probable unreliability of his results clearly in advance. When the study is completed his report to the client should state not only positive findings but also negative findings, omissions, errors, limitations in applicability of the results, etc. Suppression or omission of such information is unethical, differing only in degree from deliberate distortion or misrepresentation of the findings.

Consultants might well consider the plan of having scientific colleagues check the quality of their work. This is especially true for the one-man consulting firm which has fewer internal checks, but it also applies to larger groups. Psychologists in personnel positions could do well to have such external audits from time to time. Confidential materials, of course, could not be revealed, but an evaluation of methods and practices could be made public.

Interprofessional problems also arise. If psychologists expect lawyers, engineers, and CPAs to respect the need for professional workers on psychological problems, they in turn must be prepared to call in and cooperate with lawyers, engineers, and CPAs in the realms of their specialty.

And it must be recognized that psychologists themselves tend to be highly specialized. A test specialist who does not know much about wage-incentive

plans or attitude surveying has an ethical responsibility not to let his client misunderstand his competency by over-generalizing it. The client may still wish his services, but he is not being misled.

The panel seemed unable to reach any clear agreement on the problem of the use by the client of a consultant's reports. Some members felt that if the consultant's own report to the client is complete and unbiased, the use which the client makes of it is his own affair. This problem is especially acute in opinion studies for advertisers and publishers and in attitude and morale surveys among employees. The client's spokesman may be tempted to distort the studies in making them public. It was pointed out that such firms have their own ethical practices and principles and the question was raised as to whether the consultant need properly impose a higher code on these clients. There were some members of the panel who believed the consultant should exert his influence and have the backing of his professional association in preventing clear misuse of research findings.

The psychologist whose employer distorts his findings will have to settle for himself whether he wants to keep his job with a suppressed conscience. The outside consultant can properly arrange in his contract that the client will not use his name in any public releases without prior approval by the consultant of the exact copy of the release. He might even contract that no releases of any kind will be made. And, of course, he need not work for a client he feels he cannot trust. But the individual psychologist or consulting firm can hardly take responsibility for acts beyond his control.

**Responsibility for Psychologists Following Questionable Practices.** Two groups of industrial psychologists were referred to: those affiliated with our professional association and those outside this organization. It is accepted that professional groups are responsible for internal disciplining of their fellows but, as other groups have found, such internal checking is not a simple matter. Colleagues can help each other by direct contact on controversial procedures and, in extreme cases, group action may be desired. Ethical practice committees of the division and of the APA can become activated. The APA plan of using a research approach to develop criteria as to what are considered unethical and questionable practices was approved. There is need to collect specific case-history facts regarding individuals and methods of dealing with various kinds of cases.

Ethical practices should not be confused with competence. The two matters are intertwined. Not all psychologists are equally competent. Specialists in individual differences also exhibit a range of individual differences in ability to do good industrial personnel work. A less-competent psychologist is not to be censured for the limited quality of his work *per se*. A code of ethics must provide for lesser brothers who do the best they can within the limits of general professional standards of conduct.

**Use of Confidential Materials.** This problem took several diverse turns illustrated by the following ideas which were developed only briefly.

In general, a consultant should not give one client's data to another without explicit approval by the original client who paid for their development. This is apparent with respect to operating, fiscal or personnel data of competing companies. It is less clear when one carries a plan or idea from one client to another, since obviously the increased "know-how" which comes with experience is the property of the psychologist himself.

If a study of present personnel is being made to set standards, say for a testing program, the employees should know whether or not the data will go into the personnel files. A normative study and a personnel audit are different things and employees have a right to know what will affect them.

In many cases the industrial psychologist functions as a clinical psychologist or personal counselor, either with employees or with executives, and even their children and relatives. The question of privileged information must be clarified so that the employer and employees know in advance the degree of privacy they may expect. The use of the psychologist for industrial espionage is legally possible but fraught with many moral overtones. The revelation of personal confidences at the request of a superior is sheer unfaithfulness. It is best to clear such procedures in advance so as to avoid quarrels with management later.

Some studies will require that the confidence of the individual be strictly maintained but that the generality of these inquiries be summarized for management. In these situations the methods used for preserving anonymity must be foolproof.

Keeping our methods and conclusions secret in order not to reveal our own lack of wisdom or competence is an abuse of the principle of confidence.

**Contractual and Business Arrangements.** Consultants should be aware of the ethical as well as the financial and professional aspects of properly drawn agreements with clients.

For example, if one builds a test or weighted application blank for a client for a fee, the use of this test or blank, or approximate facsimiles thereof, with other clients must be clearly settled in advance. One might charge a smaller fee if one desires to retain use of the instrument for other purposes. Agreements as to who shall copyright an instrument, a manual or a report have proved to be an acute problem for some.

The matter of fees was touched on. Standard fees are out of the question, of course, but it is clear that fees should be not only fair but definite. Splitting of fees came up by way of mention only, and it was observed that fee-splitting and subcontracting are different things but shade into each other; consequently, professional persons need to think carefully about the problem.

An interesting sidelight was that some consultants feel that university staff members sometimes engage in unfair practice by charging much lower fees

because their overhead and basic salaries are subsidized by their institutions. University-affiliated consultants are "worth as much" as others and if they wish to consult they really should not undercut their colleagues who have to carry the whole cost-load out of their fees.

**Social Viewpoint.** The role of the psychologist as a responsible social scientist appeared several times as an issue during the discussion. Some felt that psychologists, as individuals, should "take a stand" on major social issues that are directly involved in their professional activities. Others felt that as a group industrial psychologists have no right to take sides on many issues and should operate as fact-finders. A different view was expressed to the effect that when the psychologist is working in an area of controversy it is impossible for him to be truly neutral and consequently he should make his own values and assumptions explicit. Among psychologists there probably will be found nearly every shade of social and political viewpoint; to say the least, any attempts to have a social party line of any kind for all of us is impossible.

However, when a psychologist does make a pronouncement on a controversial social issue, he can be expected to define clearly what he is presenting as experimental or case-history evidence and what is his own best-guessing wisdom. If he speaks in the name of an organization or is revealing the findings of his studies for a client, this responsibility for clearcut differentiation of fact and viewpoint is imperative.

**Some Notes from the Floor Discussion.** Some of the discussion from the floor has been incorporated at appropriate places in the above sections. Other comments, even though fragmentary, deserve mention here.

The question of back-biting among competing consultants was raised. Several men associated with consulting firms noted that their freely given criticism was against nonprofessional firms, that the firms staffed with professional psychologists are quite mutually supportive of each other and do a great deal of cooperating on jobs, on referrals and on clearing of ideas.

The suggestion for an association of consulting firms, and individuals operating as firms, seemed to strike a responsive chord. The APA Division is composed of individual members. The association suggested would have the consulting firms as members.

One of the elder statesmen of the industrial field called attention to the long history of trying to write precise codes and pointed out the continuum from white through gray to black on ethical matters among persons doing psychological work in industry. He urged that the association "move in at once" on the obviously black operators (nearly all outside the association presumably!) and fight them by all possible means now. Both by exposing quacks and frauds and by demonstrating competence ourselves, we can progressively help executives in business and industry learn to choose competent, ethical, professional men to do their psychological work. The legitimate

psychologists can make better use of the local and national Better Business Bureaus to expose frauds, both industrial and clinical, in their communities.

The writer wishes to add a final observation. By the nature of the topics, it turned out that the focus of the discussion was on the private, fee-charging industrial consultant. There was altogether too little mention of the industrial psychologist regularly employed in one firm. Their problems are somewhat different, but each of us can read the above summary in the light of his own situation and make some sense pertinent to himself. This translation process will carry all of us from cases to principles and from principles to actual behavior on our jobs. Out of this thinking and experience we may some day be able to write a code that is both organic and formalized.

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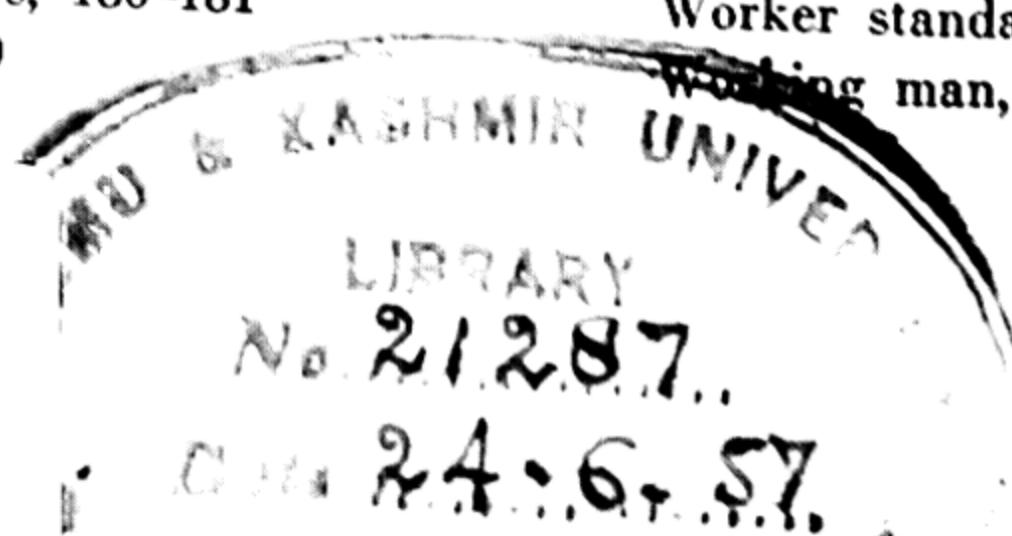
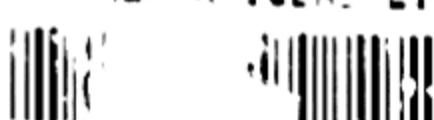
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